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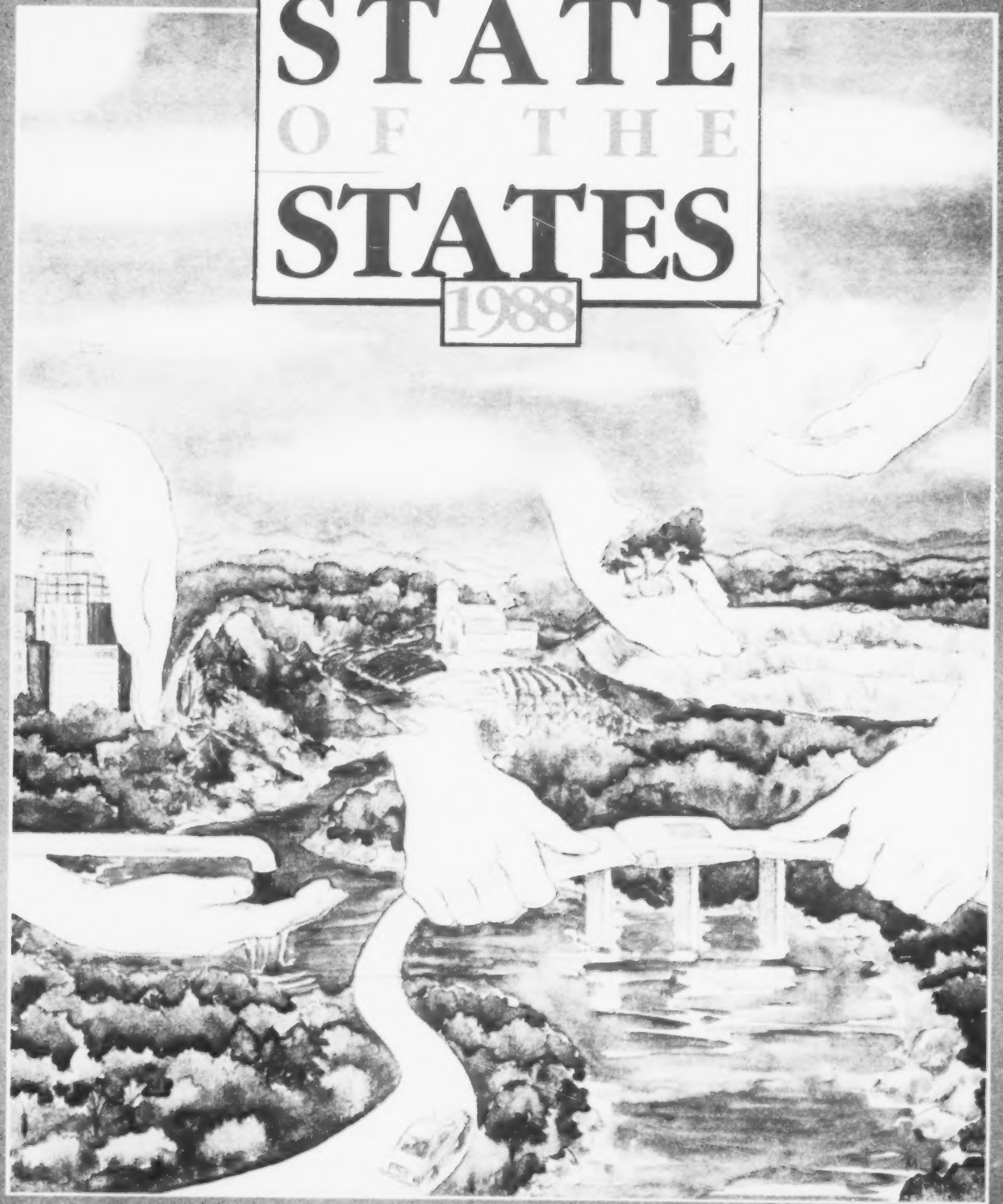
THE STATE OF THE STATES

1988



FUND FOR RENEWABLE ENERGY AND THE ENVIRONMENT

A RENEW AMERICA PROJECT

PAYING THE PIPER — NOW

"Loud talk won't get you across the dangerous valley." This ancient Masai proverb has a message for modern environmentalists.

Two things are clear about the environmental struggle. First, the need is urgent; a species, a rainforest, or an aquifer that is lost is lost forever. Second, most of the battles will be won or lost at the state and local level. Ultimately, all politics is local politics.

The urgency of the multilateral global crisis has spawned much "loud talk." But for all our flashy legislation, and all the awesome expenditures, we've made pitifully little progress across the dangerous valley. We've too often declared premature victories, and then paid too little attention to the details.

Those who drafted the U.S. Constitution 200 years ago understood this type of problem. Even while they were fashioning a document that embodied their ideals, they kept in mind that this new Constitution would face a long, contentious struggle for ratification by the individual states. Then, if adopted, it would face its real test: whether it actually served to promote the social and political results its framers sought.

Environmental policy is facing an analogous situation. The shared ideals of the environmental community are relatively clear. But the implementation of broad policies is increasingly in the hands of states and localities. Huge gaps—canyons—can be found between national objectives and local results.

Slowly, the environmental community has come to recognize that our responsibility is not discharged simply by passing sweeping legislation. That is, at most, a first step. The real success must be won in the trenches.

The purpose of this study is to share information on how the battle is going in the trenches. Each year, Renew America's *State of the States* report selects a half dozen different environmental topics and examines each state's performance relative to the other 49. In addition to ranking the states according to program strengths, the report searches for the most effective models and profiles key provisions and policies.

The 1987 *State of the States* report examined Air Pollution, Soil Conservation, Solid Waste and Recycling, Hazardous Waste Management, Groundwater Protection, and Renewable Energy and Conservation. The 1988 report focuses the spotlight on Surface Water , Pesticide Contamination, Land Use Planning, Indoor Pollution, Highway Safety, and Energy Pollution .

Every three years, we intend to revisit earlier topics to see what progress and changes have occurred during the interval.

Just one year old, the *State of the States* report is rapidly winning respect in high places as well as becoming a crucial reference volume for state environmental organizations. The Idaho Conservation League used the report as the basis for a news conference emphasizing the state's low ranking and highlighted pending legislation that would improve Idaho's programs for hazardous waste. According to the group the *State of the States* "turned an ordinary Citizen Day into a meaningful news event."

Many state officials are also finding the report useful. Tom Jorling, Environmental Commissioner of the State of New York, called the first *State of the States* report "the most important public service initiative by an environmental organization in the last decade." In effect, agencies and organizations across the country have found the *State of the States* to be an essential source of ammunition in legislative battles for tougher environmental laws and increased environmental budgets.

From Alaska to Texas to Massachusetts, state officials and environmentalists are drawing on the comparative state information to debate proposed budget cutbacks and to lend credibility to resource requests. In other states such as Louisiana, the *State of the States* has guided the new governor's transition team in recommendations for a new environmental agenda and in targeting program strengths and weaknesses.

The legislative activity and local debate that the *State of the States* has fueled emphasizes the report's relevance to today's environmental concerns. In fact, two Governors (New Jersey and North Carolina) mentioned the *State of the States'* findings in their annual reports this January. Through the added dimension of a nationwide outreach program, initiated this year as part of an effort to bring this report directly to the states and local communities, the 1988 *State of the States* will be released at simultaneous press conferences in major cities across the country.

Through this process, we hope to encourage communication between environmentalists, public health advocates and state officials, as well as provide useful information to all those concerned with a safe and healthy environment.

We hope you find it useful, and we will truly value any feedback you can give us on how to make it even more valuable in the years ahead.

Denis Hayes, Chairperson,
Renew America Project
Fund for Renewable Energy
and the Environment

Renew America is an outgrowth of Solar Action, an organization formed in 1978 to promote celebration of "Sun Day" around the world. The organization's mission was expanded in 1986 to provide new environmental tools for state and local decisionmakers in a continuing effort to build a sustainable society.

THE STATE OF THE STATES

By Scott Ridley

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The Renew America Project of the Fund for Renewable Energy and the Environment is a non-profit, tax-exempt educational organization working toward a sustainable future by promoting a safe and healthy environment. For further information on Renew America or to obtain additional copies, write to: Renew America, Suite 719, 1001 Connecticut Avenue, N.W., Washington, D.C. 20036 (202)466–6880. See inside back cover for ordering information.

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EXECUTIVE SUMMARY

One of the most important questions we face is: Who pays the cost of environmental cleanup?

During the past year we received serious warnings about ozone depletion--the hole in the sky. Here on the ground we face another hole in the form of a growing environmental deficit.

The Environmental Protection Agency has estimated that the bill for cleaning up the nation's waters will total more than $110 billion by the year 2000. Hazardous waste cleanup is expected to cost $100 billion for the worst 10,000 sites. Reducing pollution that causes acid rain is estimated to cost as much as $30 billion over five years. Disposing of highly radioactive waste is estimated to cost another $37 billion. Reclaiming more than one million acres of abandoned stripmined land will cost as much as $7 billion. Requiring stricter pollution measures at oil and gas waste sites amounts to another $6 billion per year. Limiting indoor pollution problems from radon will cost an estimated $4 billion. The list goes on.

In simple dollar terms, our environmental deficit far exceeds $300 billion. And any estimate is sure to rise. One of the most important questions we face is: Who pays the cost of environmental cleanup?

The lion's share of environmental costs has traditionally been borne by taxpayer money channeled into federal programs. But cutbacks in federal environmental protection and a shift of environmental responsibilities to the states, have now placed greater demands on local and state government. Most states are also strapped for funds. Last year, 33 states raised taxes and 24 cut budgets and reduced services. More of the same is expected this year and in the foreseeable future.

If local and state governments can't cover a significant portion of environmental cleanup costs an even higher bill will ultimately show up in increased public health risks, degradation of the environment, and erosion of quality of life.

Last year the first *State of the States* report pointed out that the nation had reached a turning point in environmental progress. Despite 15 years of steady gains, momentum for environmental protection had stalled. Headway made to reduce air pollution, for example, was hampered by inadequate federal funding and cutbacks for air monitoring in more than a quarter of the states. This year the announcement came that 62 major metropolitan areas would not meet clean air deadlines set by the Environmental Protection Agency. Some cities would take a decade or longer to reach compliance.

The story for hazardous waste sites is the same. From 1981 to 1986 only 13 sites were removed from the 888 sites on the national priority list. In 1987 just three sites were proposed for removal from the list.

Given current economic trends the delays are likely to continue. Federal funds have continued to shrink and states facing budget cuts and attempting to address traditional pollution problems are overwhelmed by the emergence of new environmental threats. Funding for environmental issues is often sacrificed to pay for vital education, housing, and highway repair programs. And unless environmental threats are immediate and dramatic, action is frequently delayed, allowing public health dangers, long- term environmental damage, and the cost of remedial action to rise.

Funds do exist to help cover environmental cleanup and minimize future problems. But the key is for state government to have the commitment and toughness necessary to take action. In part that means placing a greater amount of the environmental damage bill at the doorstep of polluters.

The federal Office of Technology Assessment has estimated that 99 percent of all government spending is for "end of the pipe" pollution control. Shifting greater liability to polluters could encourage more widespread waste minimization, neutralization, and recycling at the source.

A few states are moving in this direction. Massachusetts, for example, has enacted a new law to levy stiff fines against polluters. In the first six months of the program $697,000 in penalties were assessed. The fines serve a double purpose: making polluters help pay for the monitoring and enforcement programs, and sending a message to other polluters that it will be cheaper to stop pollution than to pay penalties.

In Iowa, where widespread pesticide contamination of water has been found, the new state groundwater protection law will draw one third of its funding from new taxes and fees on pesticide sales. Part of the money will help fund a new research center examining methods to minimize pesticide use.

Additionally, there are many "no-cost" and low-cost policies and standards that can be put in place to minimize environmental damage and protect public health. These policies include: bans on certain pesticides or on the use of materials such as lead in drinking water systems; increased fuel efficiency standards for cars and trucks; land-use planning goals and regulations to protect wellheads, aquifers and forests; and lower speed limits and use of seat belts.

Unfortunately, state governments usually do not develop the resolve for "get-tough" policies until the local environmental deficit reaches crisis proportions, as it has in states such as New Jersey and Florida. A few states such as Oregon have acted with foresight to protect the environment. Others need to take preventive action with goals and standards before degradation occurs and remedial costs rise.

In developing policies it is vital to keep an open process in which citizens can participate. And we must resolve conflicts in government priorities. On issues such as surface water cleanup, the federal government is threatening to cut off funding for North Carolina for attempting to reduce or prevent water pollution with regulations more stringent than those of EPA. This is a chilling message to send to states at the time they are developing required Clean Water Strategies for federal approval and that message could seriously weaken state water protection for the long term.

Strengthening the federal-state partnership is essential for both cleaning up existing environmental damage and minimizing future damage and future costs. The federal government plays a critical role in providing research, technical support, minimum standards for compliance, common deadlines for action, and communications between the states. State governments are best suited to implement protection plans and carry out monitoring and enforcement programs.

This report briefly examines the historical relationship between the federal government and the states, and provides an initial assessment of what has been accomplished in six environmental topics: surface water protection, reducing pesticide contamination, land-use planning, eliminating indoor pollution, highway safety, and energy pollution control. It is not intended to be a comprehensive assessment of environmental conditions in each state, but an accurate measure of key legislation and programs states have put in place to protect public health and air, water, and soil.

States show a wide range of commitment to introduce "get-tough" policies, protect public health, and reduce the environmental deficit.

Surface Water Protection

Rivers, lakes and streams have long been a dumping ground for everything from highly toxic chemicals to raw sewage. Efforts at reducing surface water contamination have essentially come full circle during the last 30 years. The 1987 Water Quality Act gives increased responsibilities to the states. In contrast to the 1972 Clean Water Act, which sought to halt all discharges of pollutants, the new law allows pollution of water to minimum standards. This philosophy may continue to emphasize "end-of-the-pipe" pollution control on which the government spends 99 percent of its funds, instead of on-site waste minimization, neutralization, and recycling. States are now in the process of formulating state Clean Water Strategies to meet requirements of the new law.

The five states with the best surface water protection programs are: NC, GA, IA, NE, VA.

Reducing Pesticide Contamination

More than 50,000 pesticides with some 700 active ingredients

are currently registered for use in the United States. Many of these are suspected carcinogens. Pesticide contamination of groundwater has spurred many states to develop monitoring programs. Only seven states lacked pesticide water monitoring programs at the end of 1986. Pesticide residue on food is also a growing concern. Only nine states lack authority to test for pesticide residues on food and all but two states have the authority to seize contaminated food. Farm workers who have much direct exposure are protected by fragmented federal laws in 35 states, and more strongly protected in 15 states. Growing use of "low-input" agriculture is hoped to minimize pesticide use in the future, but funds are needed for research and transitional farming.

The best seven states for reducing the danger of pesticides are: CA, MA, TX, CT, HI, NH, NY.

Land-Use Planning

The population of the U.S. is growing by 2.2 million people annually—the equivalent of a new Houston or New Orleans each year. The demands of providing housing, siting industry, building highways, and providing water to thirsty developments often clash with the need to protect farmland, wetlands, coastal areas, or the quality of urban life. The growth debate is often seen as a choice between maintaining either the quality of life or economic vitality. New advocates of growth slowdowns believe that land use measures can protect critical lands, keep the cost of services and taxes down, and preserve the quality of urban life. The majority of states oversee land-use with a combination of zoning and critical-use-area regulation. Statewide land-use plans are controversial, but may be essential in integrating local plans for growth and resource protection.

The nine states with the best developed land-use planning are: OR, FL, MA, CA, NJ, CT, MD, NC, VT.

Eliminating Indoor Pollution

Pollution of indoor air and water has long been a problem and over the past decade as we have sealed up buildings to cut energy costs, ventilation has been reduced and the concentration of pollutants increased. Sophisticated monitoring has also helped to better pinpoint polluted air and water. One federal study has concluded that indoor exposures to almost every chemical examined were greater than levels measured outdoors. Tobacco smoke, radon, lead in water and paint, asbestos, and formaldehyde are a few of the primary pollutants we commonly encounter indoors. Twenty states have comprehensive clean indoor air laws for public places. Five states have the most extensive radon programs. Eighteen states currently require removal of asbestos by state accredited contractors. And 26 states have banned the use of lead in drinking water systems.

The seven states the best with programs to eliminate indoor pollution are: NJ, FL, NY, CT, NH, PA, WI.

Highway Safety

Although not traditionally considered an environmental issue, highways are one of our most dangerous daily environments. Auto accidents are recognized as the leading cause of death for Americans under the age of 35. And from the sprawl of suburbia to air pollution, the automobile is also the machine with the greatest impact on our environment. How policymakers promote safe and efficient use of highways is an issue of growing urgency. In addition to a rising death toll, 40 percent of the nation's bridges are in poor condition, more than a million miles of roads will need resurfacing by the year 2000, time wasted in traffic jams and fuel user costs are expected to increase 400 percent over the next 20 years, and the failure to raise fuel efficiency standards for cars and trucks will boost the need to import oil and drill in environmentally sensitive areas.

The seven best states for efficient and safe highways are: MD, HI, PA, NJ, CA, VA, WI.

Energy Pollution Control

Environmental damage is part of the usual course of operations for traditional energy sources: coal, oil, natural gas, and nuclear power. The cost of this damage is often not included in energy prices. But the full cost is ultimately paid in degradation of the air and water, in public health problems and in tax money used for cleanup. State policymakers have begun to consider innovative energy supply programs. But inclusion of full energy costs and "least-environmental-damage" must be included as part of states' "least-cost" electrical planning. Energy efficiency and renewable energy offer a cornerstone for reducing hidden pollution costs of traditional energy sources.

The states with the best programs for energy pollution control are: MA, CA, ME, WI, FL, MI, MN, NC, OR, RI.

The Final Scores

	Total Points (out of 60)	*Rank*
Massachusetts	45	1
Wisconsin	45	
California	44	3
New Jersey	44	
Connecticut	43	5
New York	42	6
Oregon	42	
Florida	41	8
North Carolina	40	9
Hawaii	38	10
Michigan	38	
Minnesota	38	
New Hampshire	38	
Rhode Island	37	14
Maine	36	15
Vermont	36	
Maryland	35	17
Iowa	34	18
Virginia	34	
Delaware	32	20
Washington	32	
Nebraska	31	22
Pennsylvania	31	
Ohio	30	24
Colorado	29	25
Illinois	29	
Montana	29	
Utah	29	
Indiana	28	29
Georgia	27	30
South Dakota	27	
North Dakota	26	32
West Virginia	26	
Arizona	25	34
Idaho	25	
Kansas	25	
South Carolina	24	37
Kentucky	23	38
Missouri	23	
New Mexico	22	40
Alabama	21	41
Alaska	21	
Louisiana	20	43
Tennessee	20	
Nevada	19	45
Oklahoma	19	
Texas	19	
Arkansas	17	48
Mississippi	17	
Wyoming	15	50

Reading the Rankings

The chart below lists the scores for the top nine states. The last column shows the final scores—the total of all the six categories: Surface Water Protection (SWP), Reducing Pesticides Contamination (RPC), Land Use Planning (LUP), Eliminating Indoor Pollution (EIP), Highway Safety (HS), and Energy Pollution Control (EPC). Each category has been equally weighted and has been ranked on a scale of 1 to 10. Each of the individual scores was derived from several subcategories, listed on matrix pages 8, 14, 20, 26, 32, and 38, and additional data published in supplementary focus papers.

	SWP	RPC	LUP	HS	EIP	EPC	Total
Mass.	5	9	9	6	6	10	45
Wisc.	7	7	7	7	8	9	45
Calif.	5	10	8	7	5	9	44
N.J.	6	5	9	7	10	7	44
Conn.	6	8	8	6	8	7	43
N.Y.	5	8	7	6	9	7	42
Ore.	7	6	10	6	5	8	42
Fla.	5	6	9	4	9	8	41
N.C.	10	5	8	5	4	8	40

1988 State Winners in Each Category

☆ **First Place—Massachusetts and Wisconsin**

☆ Surface Water Protection—North Carolina
☆ Reducing Pesticide Contamination—California
☆ Land Use Planning —Oregon
☆ Eliminating Indoor Pollution—New Jersey
☆ Highway Safety—Maryland
☆ Energy Pollution Control—Massachusetts

SURFACE WATER PROTECTION

EPA has estimated that it will cost $110 billion to meet the nation's clean water goals by the year 2000.

On June 22, 1969, the Cuyahoga River in Cleveland went up in flames and burned two bridges. From a local perspective, it was a very unusual fire with flames five stories high blazing on the water. But in broader terms, the incident dramatized the pollution of surface water that cities have wrestled with through more than three decades of cleanup efforts.

Rivers, lakes, and streams have long been dumping grounds for everything from highly toxic chemicals to raw sewage. Progress has come for many rivers and lakes, but degradation has continued for others and new threats are ever-present. In Indiana and a number of other states, periodic warnings are issued to avoid eating fish caught in certain rivers. And the contamination of San Francisco Bay, Boston Harbor, Chesapeake Bay, the Great Lakes, and the Mississippi is expected to take decades to clean up.

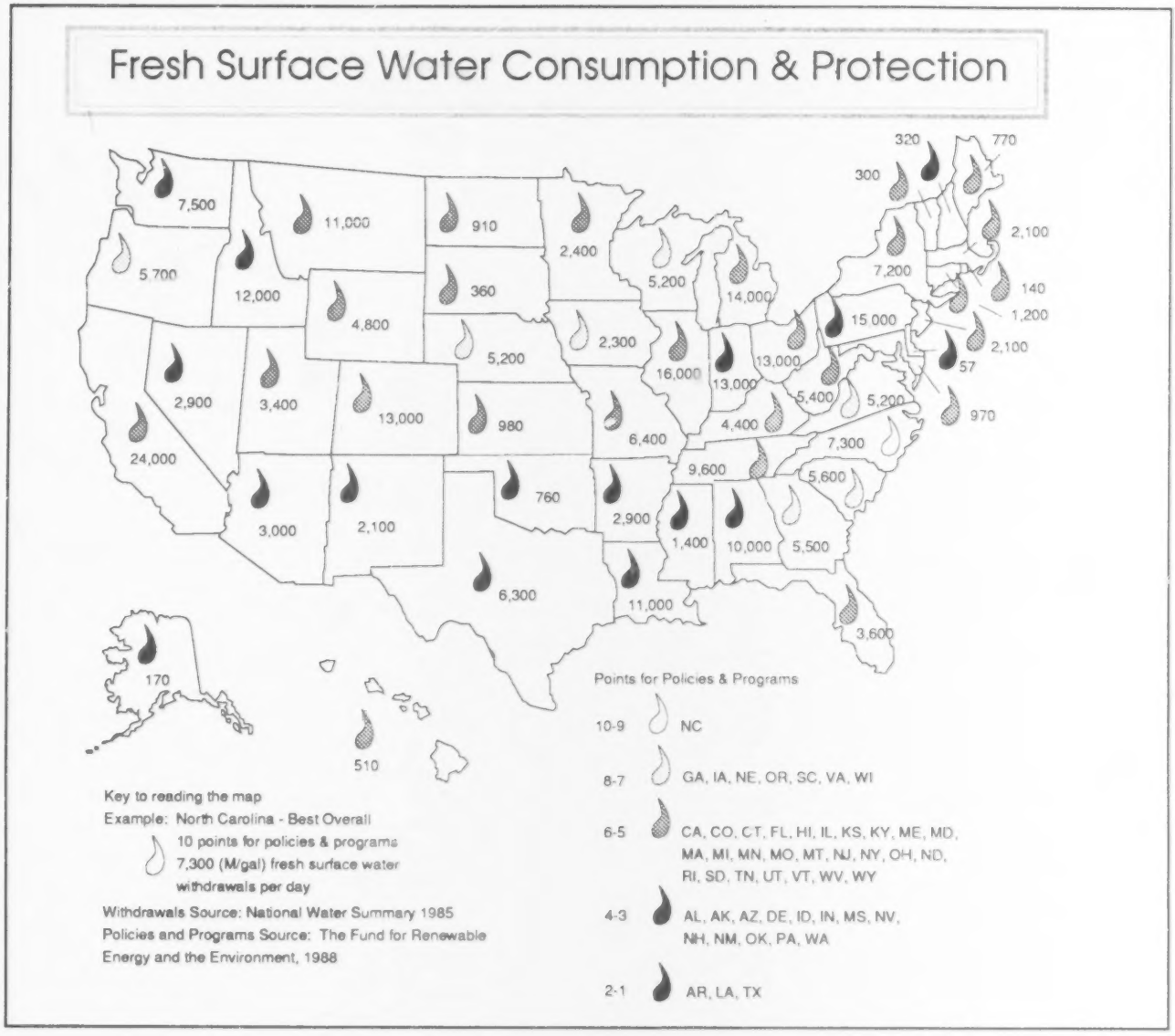
More than just unusual fires and toxics-laden fish, surface water pollution has a far-reaching effect on our drinking water. On average, half of our drinking water comes from surface water sources. In some cases all of the drinking water for major cities, such as Washington, D.C., is dependent on surface water from rivers that also receive sewage and a host of chemicals from runoff. A few rivers, such as the Hudson, the Connecticut, and the Mississippi provide both cooling water for nuclear plants and drinking water supplies. While standard tests for bacteria are conducted frequently, testing of water supplies for radioactive contamination and a wide range of toxic chemicals is infrequent at best.

In late 1987, the Environmental Protection Agency estimated one-quarter of the nation's waterways still did not meet designated uses for recreation and drinking after 15 years of efforts. The agency has estimated that it will cost $110 billion to meet the nation's clean water goals by the year 2000.1

Efforts at reducing surface water contamination have essentially come full circle during the last 30 years. Although control over lakes and rivers was traditionally a local and state responsibility, growing concern over water pollution in the late 1940s and early 1950s brought federal action. In 1956, Congress passed the Federal Water Pollution Control Act, which established a federal-state partnership. Under the law, states were responsible for setting water quality standards and carrying out enforcement. The federal government provided funding, technical assistance, and backup enforcement for interstate waters.

By the mid-1960s, it became apparent that the 1956 law was inadequate. Many states had failed to establish effective water pollution control programs and actions against polluters were vulnerable to political pressure. The Water Quality Act, passed in 1965, required states to develop water quality standards for interstate waters and their tributaries and submit them to the federal government for approval by 1967.

By 1970, studies indicated a continuing decline in water quality. Dissatisfaction with enforcement procedures was also widespread. Growing national awareness of environmental problems and the first Earth Day celebration in 1970 helped to gather support for sweeping changes in federal water laws. The debate in Congress centered on the issue of whether the law should be based on effluent standards and technology favored by leaders of the House, or on ecological considerations to eliminate all effluents which the Senate favored. Eventually, the ecological concept became dominant.



In 1972, the Clean Water Act extended federal jurisdiction to all surface waters in the United States and gave the Environmental Protection Agency a stronger mandate in the states. The law set national goals to restore surface water to recreational status by July 1983 and to end all pollution discharges to rivers, lakes, and streams by 1985. It attacked "point source" pollution—such as factory discharge pipes, sewage treatment plants, and drainage ditches— by instituting a system of effluent limits and permits. But "non-point source" pollution— runoff of pesticides and fertilizer from farmland and a variety of pollutants from city streets and highways— remained unregulated. The program also left "toxic hot spots"—waters already contaminated with highly toxic chemicals—unregulated.

The Clean Water Act achieved limited success. According to the Environmental Protection Agency, from 1972 to 1982, 296,000 stream miles were maintained at the same quality, 47,000 stream miles were improved, and 11,000 miles degraded. But the 1983 deadline for restoring fishable, swimmable waters free of contaminants came and went as did the deadline to halt point source pollution by 1985.[2]

The commonly recognized shortcomings of the Clean Water program were: limited staff and budget to take on the ambitious goals, continued political pressure against enforcement, and the gaps in regulation of non-point source pollution and toxic hot spots. Reauthorization of the law revived the original debate. This time the concept of using economic and effluent standards dominated.

SURFACE WATER MATRIX

	1 EPA APPROVED STATE PROGRAMS	2 NUMBER OF MAJOR NON-MUNICIPAL DISCHARGERS	3 PERCENT IN SIGNIFICANT NON-COMPLIANCE	4 NUMBER OF MAJOR MUNICIPAL DISCHARGERS	5 PERCENT IN SIGNIFICANT NON-COMPLIANCE	6 EPA ENFORCEMENT ACTIONS	7 PERMIT BACKLOG	8 NON-POINT SOURCE PROGRAMS AND POLICIES	9 TOTAL RIVER MILES/ PERCENT ASSESSED/ PERCENT MEETING DESIGNATED USE	10 TOTAL LAKE ACRES/ PERCENT ASSESSED/ PERCENT MEETING DESIGNATED USE
Alabama	1, 2, 3	111	6%	86	19%	1	11/9%	2	40600/30/90	505336/100/100
Alaska	0	310	3%	19	16%	63	–	1	365,000/1/53	12787200/2/53
Arizona	0	18	0	18	0	18	–	2	17,537/8/44	110770/31/86
Arkansas	1, 2, 3, 4	54	20%	58	33%	100	5/11%	2	11438/100/52	
California	1, 2	90	3%	155	8%	61	9/12%	3	26959/36/64	1397137/92/48
Colorado	1, 4	44	14%	63	4%	10	0/28%	2		
Connecticut	1, 3, 4	97	16%	67	10%	0	21/9%	5	8400/10/68	82900/45/95
Delaware	1	23	22%	14	7%	7	7/9%	4	579/89/60	
Florida	0	164	2%	110	20%	61	–	4	9320/71/68	920320/87/62
Georgia	1, 2, 3, 4	57	2%	103	8%	0	1/2%	4	20000/85/95	417730/100/87
Hawaii	1, 2, 3	15	0	11	9%	2	36/5%	3		
Idaho	0	36	19%	28	25%	9	–	4	7310/100/83	362718/100/100
Illinois	1, 2	103	13%	177	10%	8	8/1%	4	14080/24/55	242359/10/7
Indiana	1, 2	86	8%	101	28%	7	16/9%	2		92800/94/97
Iowa	1, 2, 3, 4	31	10%	63	2%	0	10/6%	4	18000/24/2	81200/91/73
Kansas	1, 2, 4	14	14%	42	2%	0	0/19%	4	20600/22/78	168164/94/66
Kentucky	1, 2, 3	212	2%	55	7%	79	11/3%	3	40000/14/55	376305/96/90
Louisiana	4	151	2%	74	31%	99	–	2	14180/18/50	514212/91/87
Maine	0	29	13%	53	10%	8	–	3	31672/100/97	994560/100/96
Maryland	1, 3	52	10%	36	28%	6	4/14%	5	9300/80/92	32583/100/76
Massachusetts	0	83	13%	102	13%	17	–	3	10704/16/48	150341/31/--
Michigan	1, 2, 3	118	8%	98	16%	11	19/11%	3	36350/100/98	
Minnesota	1, 2, 3	27	4%	50	24%	0	12/4%	4		
Mississippi	1, 2, 3	40	0	44	2%	–	0/25%	2	10274/100/90	500000/99/96
Missouri	1, 2, 3, 4	50	6%	82	11%	7	19/10%	3	20536/100/51	
Montana	1, 2, 4	19	16%	26	0	0	8/5%	4	20532/95/62	756450/88/95
Nebraska	1, 2, 3, 4	27	4%	43	12%	1	5/0	3	24000/20/57	198100/53/97
Nevada	1, 2, 3, 4	3	33%	10	0	–	25/67%	2		
New Hampshire	4	29	24%	40	5%	4	–	3	14544/9/74	
New Jersey	1, 2, 3	164	15%	155	16%	6	14/16%	4	6450/12/29	18923/100/72
New Mexico	4	14	14%	21	14%	9	–	2	3500/100/90	5725/100/92
New York	1, 2, 4	154	11%	236	6%	7	7/15%	3	70000/5/78	739000/99/80
North Carolina	1, 2, 3	90	1%	122	11%	4	12/9%	4	37359/100/67	320506/100/97
North Dakota	1, 4	7	0	16	0	1	0/0	2		
Ohio	1, 2, 3	137	13%	155	26%	15	11/17%	4	43900/15/61	
Oklahoma	4	32	9%	56	7%	58	–	3		
Oregon	1, 2, 3	24	0	35	9%	–	11/8%	4	90000/13/82	500000/38/59
Pennsylvania	1, 2	167	16%	235	12%	34	4/5%	4	50000/12/54	
Rhode Island	1, 2, 3	14	7%	20	20%	0	20/27%	3	724/100/90	16520/100/97
South Carolina	1, 2, 3	101	0	83	10%	0	7/3%	2	9679/25/87	455000/89/99
South Dakota	4	4	0	26	12%	6	–	4	9937/40/47	1598285/41/87
Tennessee	1, 3	56	4%	84	5%	–	0/4%	2	19124/30/66	538603/100/80
Texas	4	226	6%	249	17%	172	–	1	80000/20/94	
Utah	1, 2, 3, 4	18	6%	37	19%	7	–	4		
Vermont	1, 3, 4	7	0	30	7%	–	21/40%	4	4863/24/76	224066/100/94
Virginia	1, 2	66	2%	66	3%	2	0/1%	5	27240/17/20	129622/100/91
Washington	1, 3	43	16%	45	24%	1	23/11%	3		
West Virginia	1, 2, 3, 4	71	15%	34	18%	1	0/24%	2	22819/80/56	16158/100/89
Wisconsin	1, 2, 3	60	7%	87	3%	0	22/71%	5		971000/100/21
Wyoming	1, 2	24	4%	17	6%	2	20/0	4	19655/100/88	411284/70/82

In 1987, after much debate and a presidential veto, Congress passed the Water Quality Act. Its advocates say it has a mix of effluent standard and ecological considerations. It clamps down on toxic water pollution by establishing tighter controls on persistent polluters and requires compliance by March 31, 1989. It also authorizes $400 million for a new state-federal program to control non-point source pollution. It strengthens provisions regarding estuaries, coastal waters, and lakes. But at bottom it allows certain degraded bodies of water to meet minimum standards only, and allows effluents below the minimum standards to be flushed into other rivers and lakes.

It also returns substantial responsibility to the states. And it sets up a 1994 phase-out of federal construction grants for wastewater treatment facilities by establishing an $8.4 billion state revolving loan fund for localities.

States are now in the process of formulating State Clean Water Strategies required by the Act. High on the list of concerns is how states can address the non-point source contamination that makes up about half of all water pollution. State non-point source assessments are due to EPA by August 1988 and should involve public participation and comment. The assessment will be part of a multi-year plan formulated to control polluted runoff from farms, streets, construction sites, and other non-point sources.

...from 1972 to 1982, 296,000 stream miles were maintained at the same quality, 47,000 stream miles were improved, and 11,000 miles degraded.

Many states are caught between development of new programs and the need to make existing programs more efficient. Wisconsin, for example, is considered to have the best non-point source pollution program. It was established in 1978 and addresses both urban and rural non-point source pollution. The Wisconsin Department of Natural Resources (DNR) and the state's Department of Agriculture Consumer Protection Program work cooperatively on the effort. The DNR and local governments develop technical assessments and implementation plans that identify critical areas within watersheds and farmland. The state shares with landowners and municipalities the cost for installation of approved methods of controlling the identified pollution. Projects follow an eight-to-nine year planning and implementation cycle and the state has targeted 130 priority watersheds for work over a period of 25 years.[3]

Wisconsin still has problems with traditional point source pollution programs, however. The National Wildlife Federation and other environmental organizations have charged that the state DNR has refused to implement Wisconsin's anti-degradation rule that would protect rivers and lakes that have water quality above minimum standards. The state is also said to have neglected issuance of permits to control toxic pollution discharges. EPA has vetoed 17 major Wisconsin permits that did not comply with federal law and the environmentalists' case against the state is still pending a year later.

Timely renewal and approval of permits is important in keeping both standards for effluent and technology up to date. Six states have no federal approval to

MATRIX KEY

1. EPA Approved State Programs: "1"— approval of National Pollutant Discharge Elimination System permit program; "2"—approval of state regulation of federal facilities; "3"—approval of pretreatment program; "4"—state authority over construction grant program, "o"—no provision.

2. Major Non-Municipal Dischargers: number of major non-municipal facilities permitted to discharge into surface waters.

3. Percent in Significant Non-Compliance: percentage of above total violating established water quality standards specified on permit.

4. Major Municipal Dischargers: number of major municipal facilities permitted to discharged into surface waters.

5. Percent in Significant Non-Compliance: percentage of above total violating established water quality standards specified on permit.

6. EPA Enforcement Actions: number of actions undertaken by EPA to back up failure of state agencies.

7. Permit Backlog: number and percentage of total permits needing to be processed.

8. Non-Point Source Programs and Policies: scale of 1-5 for scope of state programs to control pollution from agricultural, urban, construction runoff, and other non-point sources; "5" indicates most comprehensive.

9. Total River Miles/Percent Assessed/Percent Meeting Designated Use: figures supplied by states to EPA for 1986.

10. Total Lake Acres/Percent Assessed/Percent Meeting Designated Use: figures suppled by states to EPA for 1986.

For sources, see page 47.

oversee National Pollution Discharge Elimination System (NPDES) permits, regulation of federal facilities, pretreatment programs, or construction grant management: Alaska, Arizona, Florida, Idaho, Maine, and Massachusetts. Louisiana, New Hampshire, New Mexico, Oklahoma, South Dakota, and Texas have authority over construction grants only. And Nevada, Rhode Island, Vermont, and Wisconsin—states with substantial authority—have permit backlogs higher than any other state in the country. This problem is especially critical when there are a significant number of dischargers in non-compliance, or a high percent of rivers or lakes that do not meet designated use standards.[4]

States differ not only on methods of data collection, but in the water standards they set and the kind of monitoring required.

Arkansas, Delaware, Nevada, and New Hampshire have the highest percentage of major non-municipal dischargers in significant non-compliance. And Arkansas, Idaho, Indiana, Louisiana, Maryland, Minnesota, Ohio, and Washington have more than one-fifth of the major municipal public treatment works in significant non-compliance. In many cases the Environmental Protection Agency must step in and provide backup to states unable to resolve chronic water pollution problems.

In 1986, EPA undertook 100 actions in Arkansas, 61 actions in Florida, 79 actions in Kentucky, 99 actions in Louisiana, 58 actions in Oklahoma, and 172 actions in Texas. Nine states saw no EPA actions. And 22 states saw fewer than 10 actions.Water quality assessment of rivers and lakes can vary widely from state to state. States differ not only on methods of data collection, but in the water standards they set and the kind of monitoring required. All states have general narrative requirements that all waters must be free from toxic substances in toxic amounts. But they differ on numeric criteria in defining toxic amounts. Thirty states have numeric criteria for non-organic pollutants with Colorado, New York, and West Virginia having the most. Thirty-one states have numeric standards for organic pollutants, again with New York and Colorado in the lead.[5]

Also important are bioassays—testing of organisms in the water to measure accumulation of toxic chemicals. In 1986, EPA found that 37 states require industries to conduct bioassays and 27 states require municipalities to conduct bioassays. However, the amount of testing in most states is very limited. Nationwide, only 38 percent of major industrial dischargers with permits were tested and only 11 percent of major municipal dischargers. California, Florida, New Jersey, Louisiana, and North Carolina are among the states with the most compehensive testing programs.

An upcoming challenge for both existing and new water protection programs in the states will be how to fund monitoring and enforcement activities as well as new treatment facilities. A few states are putting a greater emphasis on enforcement and fines against polluters. Massachusetts has passed a law allowing stiff fines for polluters. In the first six months, $697,000 in penalties were assessed.[6] State officials say the fines do two things: send a message to polluters that they will bear the economic consequences of cleanup—and force the polluters who don't comply to help cover the cost of the state monitoring and regulatory efforts. Another useful disincentive might be taxes placed on industries that regularly dump waste containing heavy metals into public sewage systems. On average, industries are responsible for 80 percent of heavy metals in public sewage systems. States might also assess higher fees for discharge permits.

...fines do two things: send a message to polluters that they will bear the economic consequences of cleanup—and force the polluters who don't comply to help cover the cost of the state monitoring and regulatory efforts.

Shifting greater financial responsibility to polluters may help resolve the primary issue of how to pay the $110 billion needed for surface water cleanup. It could also encourage waste minimization on-site and support new federal proposals for solutions to start at the source of pollution. Researchers at the federal Office of Technology Assessment have found that more than 99 percent of all government spending is for "end-of-the-pipe" pollution control. What they propose is utilizing our technological capabilities for waste minimization at the source—recycling, waste treatment, and waste reduction.[7]

Protecting the quality of surface water in each state is an on-going task at the heart of public health, wildlife, and quality-of life issues. Much will depend on formulation and implementation of state strategy plans, and on-going shifts in philosophy on ecological or effluent standard-based policies—as well as interrelated policies on land-use, pesticides, and energy-related pollution—all of which contribute to protecting water quality and public health.

SURFACE WATER SNAPSHOT

North Carolina represents the best overall state programs and policies to protect surface water. Overall, 67 percent of the 37,359 miles of rivers and streams in the state support designated use. And 97 percent of the 320,506 acres of lakes and reservoirs support designated use. It is estimated that non-point sources, especially agricultural and urban runoff, account for 71 percent of the degraded stream mileage. As much as one third of total lake acreage is threatened with degradation. Extensive control efforts are reported to be underway.

For non-point source control efforts, the state has begun efforts to reduce erosion and sedimentation from abandoned mines and has developed a cost-sharing program with farmers to implement measures to reduce erosion and contamination from animal wastes.

The most recent figures show 2,508 point source dischargers. Of these, 305 were municipal plants and 94 were major industrial dischargers. Of 90 major non-municipal dischargers monitored in the last half of 1986, only one percent were in significant non-compliance. Of the major municipal dischargers, 11 percent were in significant non-compliance. Thirty of the major industrial dischargers are required to undergo bioassay testing. Only 24 of the major municipal dischargers undergo bioassays.

The state maintains a network of 350 ambient water monitoring stations and has numeric criteria for 15 non-organic pollutants and 16 organic pollutants.

North Carolina withdraws 7.3 billion gallons of surface water per day. About forty-five percent of the state's population has its needs met by surface waters. Similar to other states, North Carolina faces a difficult challenge in maintaining the quality of its surface waters, and in cleaning up problem areas. In this task, it needs full cooperation from federal agencies.

Currently:

- only 12 states lack federal approval for issuing permits under the National Pollutant Discharge Elimination System;
- 20 states lack federal approval for the state to regulate federal facilities;
- 24 states lack federal approval for pretreatment programs;
- four states have made significant progress in developing programs to reduce non-point source pollution;
- 10 states have a permit backlog of less than five percent.

REDUCING PESTICIDE CONTAMINATION

Pesticide use in the U.S. rose from 200,000 pounds per year in the 1950s, to 300 million pounds by 1966, and to more than one billion pounds by 1987.

Pesticide contamination of rural water supplies, poisoning of farm workers, and toxic residues on food have become topics of increasing concern. In July 1985, for example, 1,350 people reported symptoms of poisoning after eating California-grown watermelons. The melons were found to be tainted with the pesticide aldicarb. Officials were troubled by the fact that pesticides containing aldicarb were not supposed to be used on melons. Even more troubling, the contaminated melons in many cases showed residues well below those the federal Food and Drug Administration could detect.

Ultimately, more than a million watermelons were ordered destroyed to stop the spread of illness. Dr. Robert Haines, a former Union Carbide scientist who had developed the pesticide, recommended banning its production and use in the United States and abroad.[8]

At the same time, farmworkers called for the banning of five pesticides commonly used on grapes because of the danger they posed to workers in the field. A threat to groundwater was also evident as tests done by the U.S. Geological Survey and the Environmental Protection Agency showed widespread contamination of groundwater.

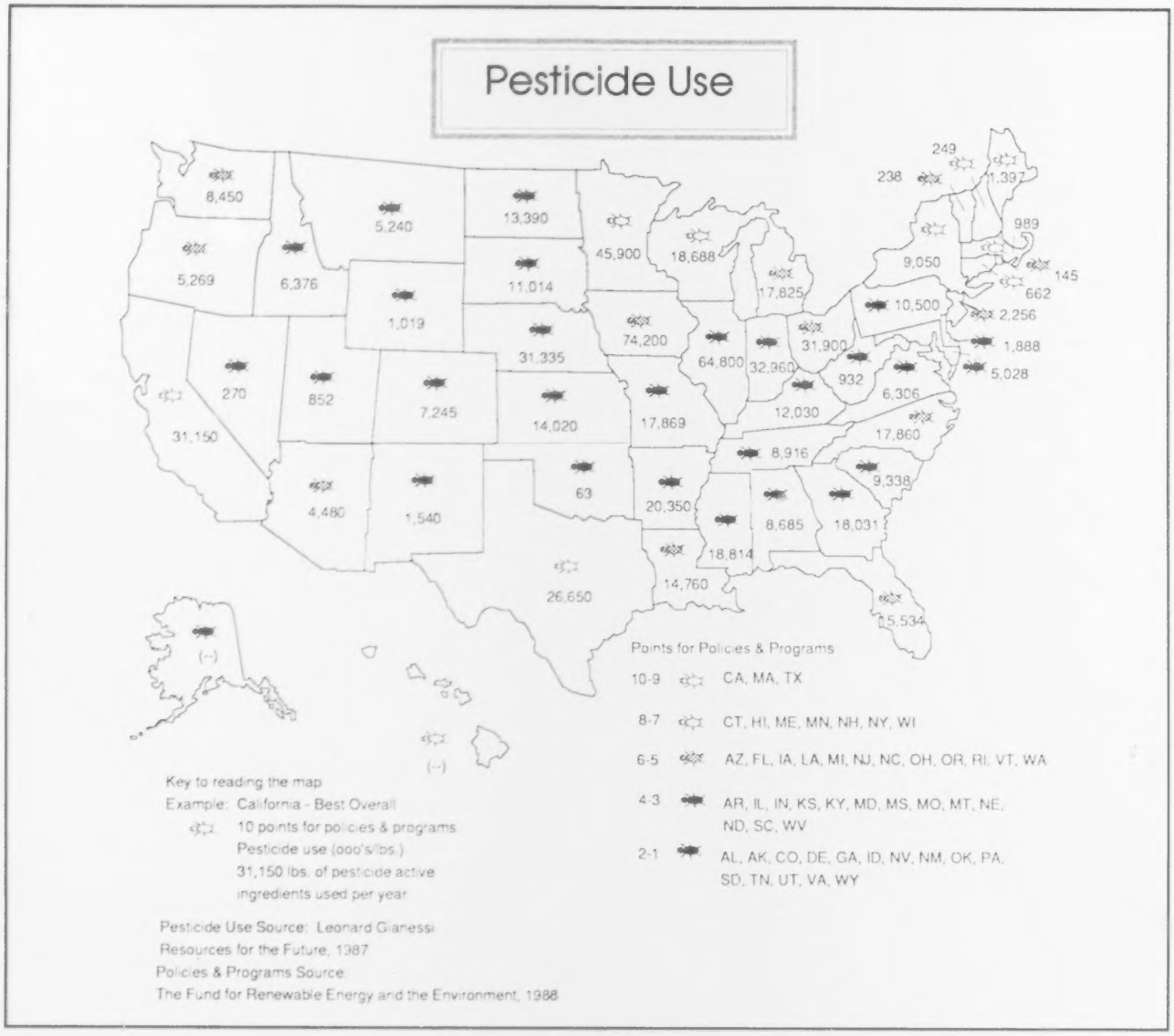
These and other events supported a growing realization of the dangers posed by chemicals used for agricultural production, insect and rodent extermination, and even lawn and plant care. Amid mounting concern, in 1986 the Environmental Protection Agency moved pesticides to the top of its pollutant list. It was a far cry from the future that had once been envisioned for pesticides.

With the postwar hopes of the 1940s, pesticides were developed as a way to bring modern chemistry into the fields to help feed the world's hungry populations and boost farmers' incomes. Effective use of insecticides and rodenticides opened the way for development of herbicides to kill weeds, as well as fungicides to reduce spoilage during storage of harvested crops. Pesticide use in the U.S. rose from 200,000 pounds per year in the 1950s, to 300 million pounds by 1966, and to more than one billion pounds by 1987.[9]

Part of the envisioned agricultural bounty arrived. Food production in the United States doubled over 1930 outputs. Due to new technologies, labor- saving machinery, chemical fertilizers, and pesticides, one hour of farm labor today produces 16 times as much food as it did in the 1920s.

But along with these gains, crop losses also increased. Farmers today still lose the same proportion of their produce as they have for decades—one third. Increasing resistance of insects to pesticides accounts for part of the problem. About 450 species of insects are considered resistant to some form of insecticide, and 20 species are apparently immune to all insecticides. To address this resistance, more frequent use of pesticides and new and more expensive chemicals have been required. Costs for pesticides and chemical fertilizers are estimated to account for 30-50 percent of farm production expenses. And the use of pesticides is believed responsible for an influx of secondary pests that overrun fields after primary pests and their natural predators have been killed off.[10]

More than 50,000 pesticides with some 700 active ingredients are currently registered for use in the United States. Many of these are suspected carcinogens. Of the total amount of pesticides used, only 10 percent is estimated to reach its target. The rest is scattered in soil and water, and



carried off by the wind.

About 25 percent of all pesticides used in 1985 were applied to non-agricultural purposes such as lawn care and wood preservatives. Four crops—corn, cotton, wheat, and soybeans—account for the bulk of agricultural pesticide use (70 percent of the insecticides and 80 percent of the herbicides).[11]

The fundamental law for regulating pesticides is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) passed by Congress in 1947. The law was mainly concerned with patents and manufacturing problems. As use of pesticides and their impacts on wildlife increased through the 1950s and 60s, public concern began to mount, much of it reflected in Rachel Carson's book *Silent Spring*.

In 1972 FIFRA was amended to include health-oriented provisions. It required that EPA register new pesticides to ensure that when used according to directions on the label, the pesticide would not present unreasonable risks to human health or the environment. One of the most important provisions also required the re-registration of pesticides already on the market to ensure compliance with these safety provisions.

The work proved to be beyond EPA's capability. A 1983 U.S. General Accounting Office study found that 48 percent of federally registered pesticides lacked data sufficient to assess their potential to cause tumors; roughly 38 percent lacked data on potential to cause birth defects; 48 percent lacked data on reproductive impairment; and 90 percent lacked data on genetic mutations. None of the older pesticides currently in use have been fully tested and assessed for their health and environmental impacts. At the current pace, re-registration of the

PESTICIDES MATRIX

	1 DRIFT RESTRICTIONS	2 PESTICIDES BANNED BY STATE	3 GROUNDWATER MONITORING	4 FOOD MONITORING	5 TOTAL FIFRA COMPLIANCE INSPECTIONS	6 PERCENT OF ACTIONABLE INSPECTIONS	7 RECORD-KEEPING REQUIREMENTS FOR PRIVATE APPLICATORS	8 FARMWORKER PROTECTION	9 ACTIVE INGREDIENTS OF PESTICIDE USED	10 ACREAGE UNDER SUPERVISION OF USDA EXTENSION IPM PROGRAM	11 BIOLOGICAL CONTROL FUNDING (THOUSANDS OF $)
Alabama	2		N		487	15.6		4	8,685,000	220,000	275.1
Alaska	6			N	28	60.7		4		3,000	
Arizona	4				247	14.9		2	4,480,000	125,000	477.8
Arkansas	2		N		319	4.3		4	20,350,000	594,578	493.7
California	1	EDB			201	17.9	R	1	31,150,000	43,500	6 460
Colorado	5		N		126	3.9		4	7,245,000	96,000	160.4
Connecticut	3	CD			156	61.5	R	4	662,000	2,000	272.6
Delaware	2			N	154	34.4		4	1,887,800	4,500	85.4
Florida	5				846	26.7		3	16,533,600		2 348.9
Georgia	5			N	1219	10		4	18,031,000	696,000	816.4
Hawaii	4	C			654	19.7		4		4,220	285.2
Idaho	7			N	69	75.3		4	6,375,500	26,805	544.9
Illinois	7				400	37.2		3	64,800,000	18,600,000	363.4
Indiana	6		*		229	89.9		4	32,960,000	137,034	298.9
Iowa	7				404	34.9		4	74,200,000	21,500	109.4
Kansas	9				227	30.8		4	14,020,000	76,300	267.7
Kentucky	3				2298	6.7		4	12,030,000	127,348	533.5
Louisiana	4				292	38.6		4	14,760,000	210,000	310.7
Maine	2				72	38.8	R	4	1,397,000	18,875	118.4
Maryland	6				585	14.5		4	5,028,000	24,900	131.5
Massachusetts	1	C,AL			106	24.5	R	4	989,000	3,750	169.5
Michigan	5				256	13.6	R	4	17,825,000	20,081	320
Minnesota	8	C			274	18.2		3	45,900,000		408.6
Mississippi	6				451	13.3		4	18,814,000	5,103,065	195.1
Missouri	8				602	46.5		4	17,869,000	13,973	159.6
Montana	5				129	13.1		4	5,240,000	84,000	186.4
Nebraska	9				NA	NA		4	31,335,000	51,560	109.3
Nevada	7		N		98	17.3		4	270,000	26,000	
New Hampshire	5	C			136	58.8	R	4	249,000	2,750	10.4
New Jersey	6			N	190	85.7	R	2	2,256,000	15,140	149.2
New Mexico	8			N	216	11.5		4	1,540,000	325,000	118
New York	8	C			386	19.9	R	3	9,050,000	10,350	782.3
North Carolina	6				492	19.3		2	17,860,000	34,400	321.1
North Dakota	6				66	7.5		4	13,390,000	22,900	154.8
Ohio	6				432	24.3		1	31,900,000	24,000	902.3
Oklahoma	6			N	363	32.2		4	62,570	309,600	132.6
Oregon	6				71	54.9		3	5,269,000	7,813	488.2
Pennsylvania	6			N	310	21.6		3	10,500,000	180,203	149
Rhode Island	8	C			61	4.9		4	145,000	3,780	13.7
South Carolina	5				409	6.6		4	9,338,000	1,368,000	305.5
South Dakota	8				466	12.6		4	11,014,000	1,020,000	20.5
Tennessee	11				543	41		3	8,916,000	45,061	193.9
Texas	1	EDB			229	57.2	R	2	26,650,000	449,718	2 308.9
Utah	10				1355	7.9		4	852,000	700	56.5
Vermont	5	TBT			55	29			237,900	5,600	
Virginia	8				430	20.9		4	6,306,000	88,500	385
Washington	3				97	0		3	8,450,000		301.9
West Virginia	3				139	9.3		4	931,900	3,311	22.1
Wisconsin	8	DIF			95	91.5		3	18,688,000	7,500	823.8
Wyoming	7		N	N	NA	NA		4	1,019,000	3,030	80.8

older pesticides is expected to extend past the year 2000.[12]

As monitoring of pesticides has increased, it has become apparent that inadequate registration of pesticides, improper application, and the failure to utilize alternative methods of farming have resulted in an increased potential for contamination of food and water, as well as increased hazards to farm workers and wildlife.

In response, most states have been stepping up their regulatory and enforcement efforts on pesticides. While EPA approves pesticide registrations based on label information and other data, states are officially delegated authority in only two areas: enforcing the label restrictions and training applicators. However, states can "go beyond the label" according to the 1972 FIFRA amendments. They can: restrict the time an manner of application; stop the use of certain pesticides on certain crops; require stringent notification procedures for workers and those who might be affected by the drift of pesticide onto non-target land; require farmers to give field workers detailed information on the risks of the pesticide, set longer periods for worker re-entry to fields that have been sprayed, conduct blood monitoring of workers and require assistance for emergency medical help; lower the allowable residue levels for pesticides in food and sample them more frequently; and require that accidents be reported.

A few states have already banned certain pesticides, and several have established programs and funding to develop alternative farming projects to demonstrate methods that minimize use of pesticides.

Groundwater contamination from pesticides has motivated many states to take action. In Kansas, pesticides were detected in 11 percent of the wells tested in 1972. This rose to 72-78 percent of the same wells in 1984. In Iowa, pesticide concentrations were found in 55 percent of the wells sampled in one study. In Nebraska, another study showed 70 percent of the wells tested to be contaminated. In some cases the problems were from pesticides or fertilizers originally expected to decay rapidly and pose no damage to water supplies.[13]

Nationally, the U.S. Geological Survey's Pesticide Monitoring Network, which operated from 1975 to 1980, found residues of atrazine at one-quarter of all the water sampling stations. Dieldrin, chlordane, and DDT were found at one-third of all sediment sampling stations. In California alone, 57 total pesticides have been found in rivers, lakes, and wells.

Only seven states lacked programs to test groundwater for pesticides in 1986. Iowa passed legislation in 1987 considered to be in the forefront of efforts to monitor and reduce pesticide contamination of water. In 1987 tests indicated that one out of seven of the state's public water supplies contains pesticides.

None of the older pesticides currently in use have been fully tested and assessed for their health and environmental impacts.

The new law allocates $65 million over five years—with one third of these funds drawn from agricultural sources: higher fertilizer fees, higher pesticide registration fees, and increased pesticide dealer license fees. The law also establishes the Leopold Center for Sustainable Agriculture, a new independent research station that will explore methods

MATRIX KEY

1. Drift Restrictions: scale of 1-11 notes extent of provisions such as financial requirements, advance notification, etc. required to regulate drift onto non-target land; "1" indicates most extensive provisions.

2. Banned by State: pesticides banned by state; "C"—Chlordane, "TBT"—Tributyltin, "AL"—Alachlor, "CD"—Cadmium, "DIF"—Dicofol, "EDB"—Ethylene Dibromide.

3. Groundwater Monitoring: "N" indicates state does not have a program to monitor groundwater for pesticide contamination, "*"—developing program.

4. Food Monitoring: "N" indicates state does not have statutory authority to test food for pesticide residues.

5. Total FIFRA Compliance Inspections: number of both agricultural and non-agricultural enforcement inspections (10/1/86-3/31/87).

6. Percent of Actionable Inspections: percentage of inspections finding actionable violations.

7. Record-keeping Requirements for Private Applicators: "R" indicates state requires private applicators to keep records.

8. Farmworker Protection: scale of 1-4 indicates extent of provisions to protect farmworkers on re-entry, advance notification, etc.; "1" most comprehensive; 1-3 goes beyond FIFRA minimum requirements.

9. Active Ingredients Of Pesticide Used: pounds of active ingredients in 184 commonly used pesticides (weighted toward corn crops).

10. Integrated Pest Management Acreage: acreage cultivated using Integrated Pest Managment principles (Illinois acreage over-reported).

11. Biocontrol: 1986 expenditures at state agricultural experiment stations and other cooperating institutions.

For sources, see page 47.

for farmers to minimize pesticide use.[14]

While rural populations and rural ecosystems face the harshest impact of pesticides, the problem also extends far beyond rural areas into urban markets and onto consumers' tables. Of the 700 active ingredients in pesticides, 496 may be found in our food supply. Tomatoes, grapes, apples, lettuce, and beans are commonly cited as produce likely to carry high pesticide residues. The National Academy of Sciences reported in May 1987 that 90 percent of all fungicides, 60 percent of all herbicides, and 30 percent of all insecticides may cause cancer.

The problem is that understaffed testing programs and holes in the information EPA uses to set the tolerance levels severely weaken food protection.

The problem is that understaffed testing programs and holes in the information EPA uses to set the tolerance levels severely weaken food protection. EPA sets safe levels of pesticide residues based on label information and company-supplied data, and the Food and Drug Administration tests fresh and processed food, while the U.S. Department of Agriculture tests meat.

EPA manages to capture only a portion of the danger through the tolerance-setting process. And the FDA and USDA capture only a small amount of the danger outlined by EPA. FDA takes an estimated 12,000 samples of domestic and imported food each year, less than the annual number of samples taken by California's Board of Food and Agriculture.

According to the General Accounting Office, the FDA "does not regularly test food for a large number of pesticides that can be used or may be present on food...FDA does not prevent the marketing of most of the food that it finds to contain illegal pesticide residues, or penalize growers who market food..." There is also the problem of pesticides banned in the United States being used on food that is imported into the country.[15]

The authority for states to act to protect food varies widely, and often their testing programs are not any more effective than the FDA's. All but two states have the authority to seize contaminated food, and nine states lack the authority to test for pesticide residues. Twenty-three states have automatic adoptions of FDA rules, leading to quicker action if a tolerance is lowered.

FDA studies on pesticides in the typical adult diet show a decline of DDT and dieldrin since 1965 due to federal bans on the chemicals in the 1970s. But the levels of toxaphene, the major substitute for these chemicals, increased in the period of 1965 to 1982. Residues of pesticides in current use are found in 95 percent of human tissue samples analyzed.

In addition to contamination of food and water, pesticides present a specific danger to those who manufacture the compounds in chemical plants, apply them in the fields, or work in fields that have been recently sprayed.

Workers in pesticide factories are protected by the Occupational Safety and Health Administration. But the applicators and field laborers are not. They are covered by a small section of FIFRA that was last revised in 1974. Due to a lack of data on pesticide poisonings, it is difficult to estimate the number of incidents nationwide. One epidemiologist working with California data has estimated that 313,000 farm workers in the U.S. may suffer the effects of pesticide-related illness each year, including such acute symptoms as dizziness, vomiting, pin-point pupils, and severe skin rashes. Beyond this estimate, an unknown number of people are believed to endure more subtle effects such as chronic disorders of prolonged depression of an essential enzyme called cholinesterase.

...it is clear that more monitoring, better enforcement, and more funding will need to be devoted to detecting and limiting the damage already generated by pesticides.

Thirty-seven states currently offer their farm workers only the protections specified in FIFRA. Several other states have right-to-know provisions, but some of these have been thrown into doubt by a recent OSHA attempt to include farmworkers under a weaker OSHA requirement. Texas is one state that may be particularly affected by OSHA's actions.

Texas recently initiated a program that received high praise from farm worker advocates. It is a special worker right-to-know initiative. Crop sheets describe risks and protections for farm workers for pesticides likely to be used on that crop. The sheets are written in both Spanish and English and are to be distributed to workers upon request. OSHA's weaker rule for only a technical sheet to be issued may take precedence over the Texas requirement.

The general trend of efforts to minimize use of pesticides is through "organic," "sustainable," or "low-input" agriculture—utilizing organic methods of farming and other practices known as biocontrol and Integrated Pest Management. While research and debates over the value of various alternatives continue to evolve, it is clear that more monitoring, better enforcement, and more funding will need to be devoted to

detecting and limiting the damage already generated by pesticides.

Hopes for minimizing pesticide use rest in part on the ability of farmers already suffering from a depressed farm economy to make a transition to alternative methods. While requiring less capital, these methods are usually more labor intensive and, during a two or three year period in which land is in transition, crop production and income can decline. Along with research and educational efforts among farmers and farm organizations, a trust fund recently proposed to sustain these activities should be supported by a modest national tax on farm chemicals.

PESTICIDES SNAPSHOT

California represents the best programs for reducing pesticide contamination of water, food, and farm workers. The state has been widely acknowledged to be moving faster than the federal government to contain the public health and environmental threats from pesticides. In total, 33 million acres—19 percent of all non-federal land in the state—is in farm production.

Nine million of those acres are intensively farmed, producing three crops per year. According to Resources for the Future estimates, 31 million pounds of active ingredients of the 184 most common pesticides were used in California. Agricultural production income exceeded $13.9 billion in 1986, 45 percent more than the next leading state. State and county pesticide regulatory expenditures total more than $40 million annually, approximately the same size annual budget as the U.S. EPA Office of Pesticide Programs.

In 1985, the California Birth Defects Prevention Act was passed, requiring state agencies to fill many of EPA's gaps in pesticide data. The law allows the state to cancel the registration or refuse to register any pesticide for which there is a practical alternative demonstrated to be less damaging to the environment. The state requires companies registering pesticides to submit studies on their potential to cause reproductive damage, mutations, cancer, and nerve damage.

Additionally, the state has some of the most comprehensive restrictions to control drift of pesticides from target areas has established a groundwater monitoring program for pesticide contamination, tests more samples of food for pesticide residues than the federal Food and Drug Administration requires record-keeping by private pesticide applicators and offers some of the most developed protections for farmworkers.

Currently:

- three states have the most extensive provisions to restrict the drift of pestcides onto non-target land, wildlife, or water;
- 11 states have issued bans on specific pesticides;
- only seven states lack programs to test water for pesticide contamination;
- nine states lack authority to test food for pesticide residues
- two states have implemented the most developed policies to protect farm workers from pesticide poisoning.

LAND USE PLANNING

Many environmentalists are encouraged by the new concern about growth but fear that planning efforts will be too little, too late, or succeed only in contributing to urban sprawl.

More than 6,200 new residents arrive in Florida each week, carrying hopes for sun and prosperity and bringing with them all of the problems that come with a steady growth in population. Each day the state needs two new miles of highway, two new classrooms, two more police officers, thousands of gallons of new water supplies, and more tax money for services.[16]

Most of the new residents settle along the coast, adding fuel to a long debate between developers and environmentalists. During the past few decades, miles of houses, condominiums, and hotels have risen along the beaches, contributing to the destruction of mangrove swamps and the decay of coral reefs and marine life. Inland, highways have sliced through forests to threaten endangered species of wildlife. And all across the peninsula the consumption and contamination of groundwater has become a primary concern.

In Southern California, where boom-and-bust cycles have long been a way of life, debates have kindled over the rates of urban growth. In San Diego, the city council recently voted to cut new housing starts from 15,000 to 8,000. And in Los Angeles voters approved a measure to reduce by one-half the size of buildings on most industrial and commercial property.

The growth debate is often posed as a choice between maintaining economic vitality or general quality of life. But new advocates of growth slowdowns believe that saving coastal or agricultural land, or reducing traffic jams and crowding, preserves economic health of cities and helps keep the cost of services down. Many environmentalists are encouraged by the new concern about growth but fear that planning efforts will be too little, too late, or succeed only in contributing to urban sprawl.

Decisions being made in Florida, Southern California, and rural areas across the country reflect a dilemma that is intensifying as the number of Americans grows by 2.2 million each year—the equivalent of a new Houston or New Orleans. The demands of providing housing, siting industry, building highways, and providing water to thirsty developments often clash with the need to protect farmlands, wetlands, coastal areas, or the quality of urban life. Depending on the general environment and land-use patterns of a state or region, the conflicts can vary widely. But a common solution for both managing growth and setting priorities for areas needing protection is land-use planning.

The United States has a land area of 2.25 billion acres for a population of 243 million people. The federal government owns about 700 million acres, or one third of the nation's land area, most of it in the western states and Alaska. Three-fifths, more than 1.3 billion acres, is privately owned. State and local governments own 155 million acres and Native American lands total 51 million acres.

State governments oversee some uses of federal land, but their regulation is largely limited to the remaining two-thirds in public and private ownership. About half the land in the country is cropland and grazing land. One third is forestland. And the remainder is split between developed land, open swamps, desert, and tundra.

The general trends for changes in land-use are: a decline in farmland, a decline in forestland, and migration into cities and coastal areas. By 1990, 75 percent of the population is expected to live within fifty miles of a coast.[17] The big growth states are: Alaska,

Nevada, Arizona, Florida, Texas, California, Utah, New Mexico, Colorado, and Georgia. And those with declining populations are: Iowa, Nebraska, North Dakota, Montana, Idaho, West Virginia, Oklahoma, and Wyoming.

Growth and migration under the free enterprise system is largely unmanaged. But the impacts and the chaos that can result in depletion of water supplies, or traffic jams, or pollution do need to be managed. Despite negative or postive growth rates, land-use planning provides a public process to set priorities and address everything from roosters in a neighbor's backyard to setting aside tracts in a state plan for industrial development or aquifer protection. States can be grouped into three general categories for how comprehensively they utilize land-use controls and planning.

The vast majority of states oversee development through zoning based on laws dating back to the federal Standard State Zoning Enabling Act of 1922 and the Standard City Planning Enabling Act of 1928. With statutes modeled on these federal laws, states give zoning and subdivision powers to local and municipal governments. In many areas, however, even the most common zoning regulations do not exist. Only eight states have greater than 85 percent of their cities and towns utilizing zoning regulations. Another 15 states have between 60 and 84 percent of the cities and towns with zoning laws. In 20 states the figure is 30 to 59 percent. And in five states, 29 percent or less of the cities and towns have enacted zoning laws.

Zoning laws and regulations

LAND USE MATRIX

	1 STATE POPULATION (IN THOUSANDS)	2 TOTAL LAND ACREAGE (IN THOUSANDS)	3 PERCENTAGE OF FEDERALLY-OWNED LAND	4 PERCENTAGE OF LAND THAT IS URBAN	5 PERCENTAGE OF NON-FEDERAL CROPLAND	6 ACREAGE IN STATE FORESTS	7 PERCENTAGE OF LAND IN STATE PARKS	8 KEY OR CRITICAL AREA PROTECTION	9 PROPORTION OF COMMUNITIES USING ZONING REGS.	10 LITTLE NEPA	11 STATEWIDE LAND USE PLAN	12 POWER PLANT SITING	13 HAZARDOUS WASTE FACILITY SITING
Alabama	4,083	32,491	4	3	14	48,,326	0.15	c,wt	3				
Alaska	525	365,333	86	nd		2,047,000	0.86	c,wt		2			
Arizona	3,386	72,645	44	2	3	2,560,000	0.22	wt	1	3		X	1, 2, 3, 4
Arkan[illegible]	2,388	33,330	10	2	27	18,000	0.95	wt	4			X	
Califo[illegible]	27,663	100,031	48	6	19/P	70,398/P	0.75	c,wt	1	1		X	12
Color[illegible]o	3,296	66,301	36	2	25	0	0.14	c,wt	2		P		1, 2, 3, 4
Connecticut	3,211	3,118	0	19	8	136,529	0.96	c,wt	1	3		X	1, 2, 3, 4
Delaware	644	1,237	2	11	43	6,386	0.82	c,wt	1				
Florida	12,023	34,658	13	9	11	304,310	0.96	c,wt,wh	2	3	P	X	
Georgia	6,222	37,156	6	5	19	52,000	0.13	wt	3				2
Hawaii	1,083	4,112	20	3	9	661,560	0.60	c,wt		3	P		
Idaho	998	52,744	64	1	33	3,213,150	0.06	wt	3				
Illinois	11,582	35,613	2	5	70	16,557/P	0.30	wt	3			X	
Indiana	5,531	22,996	2	5	61	146,518	0.22	c,wt	2				2
Iowa	2,834	35,818	1	2	74	25,000	0.17	wt	3			X	3
Kansas	2,476	52,338	1	1	56	0	0.07	wt	4			X	
Kentucky	3,727	25,388	5	3	24	44,420	0.16	wt	3	3			
Louisiana	4,461	28,494	4	3	24	8,050	0.05	c,wt	3				1, 2, 3, 4
Maine	1,187	19,837	1	1	5	108,117	1.21	c,wt	3				1, 2, 3, 4
Maryland	4,535	6,296	3	13	29/P	131,841/P	1.32	c,wt	2	1		X	1, 2, 3, 4
Massachusetts	5,855	5,008	2	18	6/P	207,076	2.12	c,wt,wh	1	1		X	1, 2, 3, 4
Michigan	9,200	36,451	10	6	28	3,795,500	0.61	c,wt	2	3		X	1, 2, 3, 4
Minnesota	4,246	50,911	7	2	49	1,940,28/P	0.05	wt	2	1		X	
Mississippi	2,625	30,229	6	2	26	131,803	0.41	c,wt	4				3, 4
Missouri	5,103	44,125	5	3	36	0	0.22	wt	3				
Montana	809	93,048	29	0	26	203,000	0.05	wt	4	1		X	
Nebraska	1,594	49,052	2	1	42	0	0.28	wt	3	3			1, 2, 3, 4
Nevada	1,007	70,332	85	2	9	102,000	0.22	wt	1	3		X	4
New Hampshire	1,057	5,756	13	5	3/P	75,629/P	0.50	c,wt	2			X	
New Jersey	7,672	4,779	3	25	18/P	202,826	1.15	c,wt	1	3	P	X	1, 2
New Mexico	1,500	77,654	33	1	5	0	0.08	wt	3			X	
New York	17,825	30,321	5	6	20/P	840,000/P	4.66	wt	2	1		X	
North Carolina	6,413	31,260	7	6	23/P	1,069	0.30	c,wt	2	1			1, 2, 3, 4
North Dakota	672	44,352	5	1	64	12,725	0.03		2			X	
Ohio	10,784	26,243	1	8	48	168,604	0.69	wt	3			X	
Oklahoma	3,272	43,939	4	2	27	0	0.16		4				
Oregon	2,724	61,558	50	2	15	80,000/P	0.14	c,wt	2		P	X	
Pennsylvania	11,936	28,728	2	7	21/P	1,872,090	0.98	c,wt	3				
Rhode Island	986	675	1	21	4/P	30,000	1.48	c,wt	1	3			
South Carolina	3,425	19,330	6	5	20	45,000	0.36	c,wt	3			X	
South Dakota	709	48,609	7	1	37	0	0.19	wt	3	1		X	
Tennessee	4,855	26,339	7	4	22	150,303	0.33	wt	3				
Texas	16,789	167,691	2	3	20	7,147	0.09	c,wt	3	3			
Utah	1,680	52,527	64	2	12	0	0.15	wt	3	3			
Vermont	548	5,935	5	2	12/P	0	2.67	wt	2			X	1, 2, 3, 4
Virginia	5,904	25,410	10	5	15	53,159	0.27	c,wt	2	1		X	
Washington	4,538	42,567	29	3	26/P	3,400	0.38	c,wt	2	1		X	4
West Virginia	1,897	15,436	8	2	8	69,861	0.43	wt	3				
Wisconsin	4,807	34,833	5	3	35	427,550	0.34	c, wt	2	1		X	1, 2, 3, 4
Wyoming	490	62,073	50	1	8	0	0.09		3			X	

have traditionally addressed health, morals, and general welfare in communities, and are largely inadequate to resolve many of the complex issues we currently face. But recently more creative uses of zoning have become prevalent. The number of counties and municipalities with agricultural zoning to restrict development and protect prime farmland, for example, increased from 270 in 1981 to 500 in 1986. Local governments in 28 states now have some form of agricultural zoning.[18]

In many areas... even the most common zoning regulations do not exist

A related concept is a "growth boundary" or "urban limit" designed to separate urban and rural areas. The boundary describes the limit of the full range of urban services such as sewer and water. Some communities have also begun to place upper limits on population, and residential or commercial and industrial development. The decision to limit the number of housing starts in San Diego is a step in this direction.

Zoning is also being used to protect critical areas such as watersheds, steep slopes, and other environmentally sensitive land. But the general shortcoming of county or municipal zoning is that it usually cannot address regional problems.

In the early 1960s and 1970s, state governments began to develop more comprehensive land-use controls to resolve regional problems. In many cases a few states would initiate a law and the federal government would pass legislation encouraging others to follow suit. Following the lead of the federal National Environmental Policy Act, 24 states have developed some form of "Little NEPAs" in an attempt to ensure that state funded projects, such as highways and other major developments, would not have adverse environmental impacts. The state laws generally required an environmental assessment and the filing of an environmental impact statement, along with public hearings to discuss the findings.

Along with their "Little NEPAs," some states also began to identify and protect key or critical areas within a region. Following passage of wetlands protection in the Clean Water Act, all states passed provisions to protect wetlands. But because of lax standards and enforcement and the pressures of development, the nation is still losing half a million acres of wetland habitat each year. Louisiana is reportedly losing $145 million each year in sport and commercial fishing because of the decline in wetlands. And in addition to wildlife habitat, wetlands provide important aquifer recharge areas.[19]

In the early 1960s and 1970s, state governments began to develop more comprehensive land-use controls to resolve regional problems.

Power plant siting is an issue states have also taken up as a critical regional planning element. In 1980, 15 states had special regulations to oversee the siting of power plants. In 1987, 28 states had such regulations. Industrial development of this type, however, and competition between communities to develop their tax bases, or protect broad agricultural, forest, or residential areas from other

MATRIX KEY

1. State Population: 1987 U.S. Census Bureau figures.

2. Total Land Acreage: USDA most recent statistics (1982).

3. Percentage of Federally-Owned Land: Conservation Foundation figures (1987).

4. Percentage of Urban Land: percentage of land that is urban and built-up (Ibid. 1987).

5. Cropland: percentage of non-federal land used for crops. "P" — state has developed a purchase of development rights program (PDR).

6. Acreage in State Forests: 1986 estimates from National Association of State Outdoor Recreation Liasion Officers; "P"— state has passed a forest planning act.

7. Percentage of Land in State Parks: 1986 estimates, Ibid.

8. Key or Critical Areas: specific state provisions for protection of: coastal areas "c", wetlands "wt" and wellheads "wh."

9. Proportion of Communities Having Zoning: "1"—85% or more, "2"—60–84%, "3" 59–30%, "4"—29% or fewer.

10. Little NEPAs: "1"--has law very similar to the federal one, "2"-- an EIS process, "3"--EIS on a more limited basis.

11. State Land-Use Plan: "P"—state has passed legislation for development of a statewide land-use plan (varying levels of implementation not noted on matrix but taken into account in ranking).

12. Power Plant Siting: "X"—state oversees siting of power plants.

13. Hazardous Waste Siting: state oversees siting of hazardous waste facilities; "1"—examines surface water impacts, "2"—examines groundwater impacts, "3"—examines geology, "4"—conducts physical/ chemical studies of site.

For sources, see page 47.

development have encouraged the creation of other controls and incentives.

During the 1970s, plans to protect farmland and forest from development took the form of "purchase development rights programs." These programs remove speculation pressures by purchasing development rights of targeted lands from owners and allowing them to continue current use of the land. In 1988, 11 states had such programs.

State involvement in critical land–use decisions and growing oversight of local planning decisions on major projects encouraged development of statewide land-use planning.

Another common measure is to protect an entire region. In 1972, Congress passed the Coastal Zone Management Act and gave 30 states with shoreline on the Atlantic, Pacific, Gulf of Mexico, and Great Lakes grants totalling $16 million a year to regulate coastal development. Additionally, North Carolina passed a special coastal protection plan in 1974 and California passed a similar law. New Jersey set up a zone to protect its northern Pinelands in 1979.

State involvement in critical land use decisions and growing oversight of local planning decisions on major projects encouraged development of statewide land-use planning. Hawaii, Vermont, Colorado, Florida, Oregon, and New Jersey have initiated efforts at statewide land-use goals.

Hawaii developed the first state-wide plan in 1961. Its land market, culture, and development patterns differed significantly from the rest of the country, however. It established a Land Use Commission empowered to zone the state in four land–use districts and issue special permits or zoning variances. Although it left a fine legacy, the planning law is now considered outdated in terms of statewide planning practices. And in 1984, the Hawaii legislature loosened the potential integrated policy framework for county plans to be consistent with state plans and guided by them.[20]

A few other states have also passed statewide land-use planning laws, but the compromise they attempt to form between development and environmental needs on a large scale usually encounters considerable controversy. Colorado passed a statewide land–use planning law, but its effect has been gutted by elimination of staff and enforcement. And Oregon, which passed its law in 1973, has faced repeated challenges.

Oregon has been noted as the groundbreaker in statewide land-use planning, by establishing goals and a process that seeks consistency among policies at the regional and local levels. The land use plan resulted in 15.5 million acres of productive farmland being placed in exclusive farm zones and 12 million acres of forests being included in the protective policies of local plans. But controversy has surrounded plans to protect rivers and streams from alleged abuses by the timber industry, and a number of counties have delayed submission of their plans to the state.[21]

In Florida, where cities and towns were far behind on efforts to submit plans first called for in 1969, recent legislation has given renewed hope for success and has improved on the Oregon model. In 1985 the Local Government Comprehensive Plan and Land Development Regulation Act required local governments to submit plans containing coastal zone management, traffic circulation, housing, and all essential elements for management by July 1, 1990. Localities that don't comply will have plans prepared by regional agencies and will be billed for the work. One of the most important elements is the opportunity for citizens to challenge a local plan if it is believed to be out of compliance with the state planning requirements.

Florida is also looking at innovative ways to make growth bear its own environmental costs. Nearly half the total state and local costs of implementing the state comprehensive plan relate to transportation. An increase in gasoline taxes of 10 cents a gallon has been recommended to help secure bonds, as well as local optional sales taxes.[22]

During the heyday of land-use planning in the early and mid-1970s, there was considerable support for a federal land–use planning law that would have sparked designation of critical areas and regulation of development at the state level.

Oregon and Florida are recognized as the leaders in state land-use planning, but other states are not expected to resolve differences between competing interests and follow soon. It isn't likely that these model plans will bubble up to the federal level any time soon either.

During the heyday of land-use planning in the early and mid-1970s, there was considerable support for a federal land-use planning law that would have sparked designation of critical areas and regulation of development at the state level. In 1974, a national land-use policy act passed in the Senate and failed by only seven votes in the House.

The trend in the 1980s appears to be focused on greater decision-making on land-use at the

local level. In addition to innovative zoning efforts, other concepts such as "development timing" are also emerging. This regulates growth for urban areas by establishing a sequence for construction of public facilities, issuance of building permits, and development plans. California's cities are also expected to have set a precedent for going to voters with planning issues.

On a broader scale, the federal government is taking a piecemeal approach at preserving key or critical areas. The federal Conservation Reserve program offers farmers incentives to preserve fragile cropland by taking it out of production. Several states have followed suit with their own conservation reserve programs. Protection of groundwater and aquifers is also being stimulated by federal and state concern over contamination of groundwater.

As public concerns over air pollution, toxic waste, solid waste, groundwater, farmland and urban development continue to grow, calls for stronger and more integrated state regulation is inevitable. Timing, foresight, and a willingness to compromise will be essential. Policymakers in each state and locality will need to decide on whether land-use planning will be crisis management or management to avoid or minimize crises.

LAND-USE SNAPSHOT

Oregon was the first state to attempt establishment of state wide land-use planning goals and policies. A state wide land-use planning law passed in 1973 has provided an integrated framework for local planning. The Land Conservation and Development Commission is responsible for the state plan and is also empowered to review local plans for compliance with state goals. All state agencies are also required to adopt plans consistent with state goals.

The goals include establishment of urban growth boundaries, housing targets, protection of farmland and forestland, and water ways. The plan has resulted in more than 15 million acres of farmland being placed in exclusive farm–use zones and 12 million acres of forests being included in protective policies of local plans. Plans to protect rivers have reportedly run into opposition from the timber industry.

In addition to the state wide planning process, Oregon also has programs to protect key and critical areas such as coastal areas and wetlands and a plan for state forests. The state also oversees siting of power plants, but lacks defined policies for the siting of hazardous waste facilities. Sixty to 84 percent of the cities and towns in the state utilize zoning regulations.

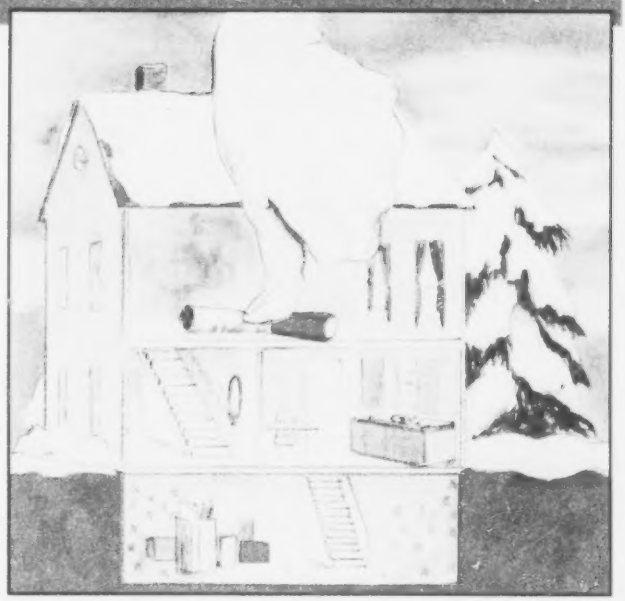
Despite shortcomings and controversy over the state wide plan, Oregon represents the best land-use planning policies in place.

Currently:

- Eight states have greater than 85 percent of their municipalities utilizing zoning regulations;
- 15 states have between 60 and 84 percent using zoning regulations:
- 20 states have between 30 to 59 percent using zoning regulations;
- five states have 29 percent or less of their municipalities using zoning regulations;
- 24 states have enacted policies similar to the National Environmental Policy Act requiring environmental impact statements;
- 28 states have special regulations to oversee power plant siting;
- 12 states have comprehensive regulations to oversee hazardous waste facility siting;
- five states have passed state wide land-use planning legislation.

ELIMINATING INDOOR POLLUTION

...the danger of cancer caused by radon in the home is 100 to 1,000 times greater than the dangers posed by living near a Superfund toxic waste site.



On December 14, 1984, on his way into work at the Limerick Nuclear Power Plant in Pottstown, Pennsylvania, Stanley Watras set off a radiation monitor. The plant was inactive at the time, but testing at Watras' home showed radiation levels in the living room 700 times higher than the maximum considered safe for human exposure.[23]

Further testing traced the radiation to gas given off by underground uranium. The incident sent a wave of concern through Pennsylvania and states with similar geologic deposits. Environmental Protection Agency research indicates the danger of cancer caused by radon in the home is 100 to 1,000 times greater than the dangers posed by living near a Superfund toxic waste site.[24]

Pollution of indoor air and water has long been a problem. But over the past decade especially, as we have sealed up buildings to cut energy costs, ventilation has been reduced and the concentration of pollutants in the air increased. More sophisticated monitoring has also helped to pinpoint toxic air and drinking water contaminated with chemical pollutants as well. A study done by EPA concluded that indoor exposures to almost every chemical in the study were often much greater than levels measured outdoors.

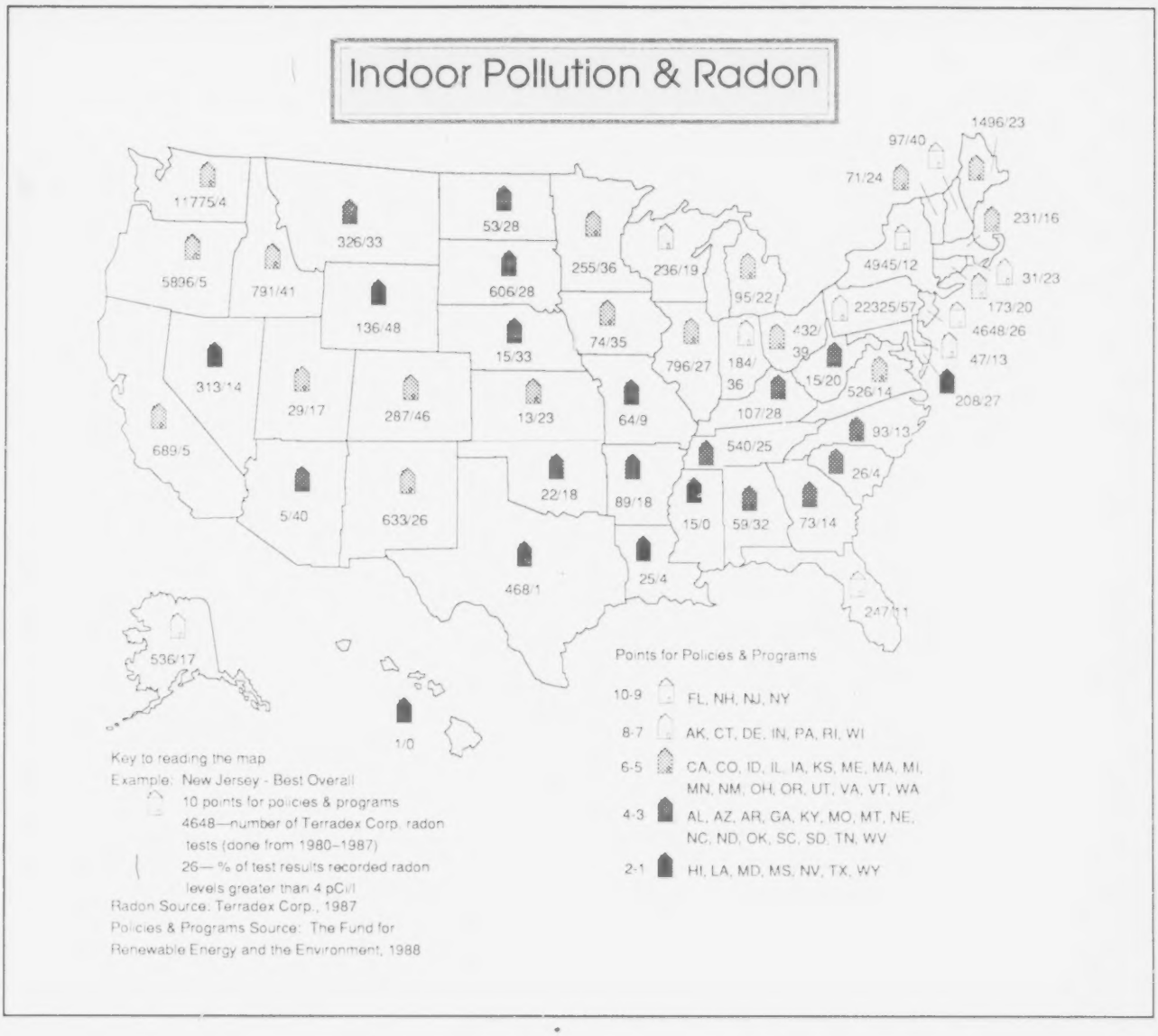
Some compounds, such as carbon monoxide, can be highly toxic with a single exposure. Other pollutants, such as radon, tobacco smoke, formaldehyde, asbestos, or lead usually deliver harm from prolonged or periodic exposure to relatively low levels. The effects may not be apparent for years. And while most of us spend the majority of our time indoors, the very young, the elderly, and those who are ill or sensitive to particular chemicals, are especially at risk.

Unlike many other environmental issues, indoor pollution is a cutting- edge topic with few established standards for pollutants, little coordination between agencies, and little funding. Lance Wallace, an EPA scientist who has directed research on indoor air pollution, says, "We're spending $200 million a year trying to reduce outdoor air pollution and $2 million a year on indoor air pollution. Frankly, I think it should be reversed."[25]

Cigarette smoke has received the greatest attention as an indoor pollutant. The federal government began to take action on smoking following a report in January 1964 from the Advisory Committee to the U. S. Surgeon General that indicted cigarette smoking as a cause of illness and premature death. A warning was required on each cigarette pack, and a ban on cigarette advertising on television followed. More recently, federal rules restricted smoking to designated areas in all federal buildings. And on April 23, 1988, a federal law barring smoking on all scheduled airline flights of two hours or less is scheduled to go into effect.

An estimated 52 million adults and two million teenagers in the United States smoke about 600 billion cigarettes annually. While the price of cigarettes for an individual is about $12 per carton, the federal Office of Technology Assessment estimates society pays $20 when the full subsidies, health and environmental cost impacts are taken into account.[26]

Cigarette smoking accounts for some 300,000 to 350,000 deaths every year, and more than just the smoker is affected. Disease due to inhalation of tobacco smoke extends to those who inhale the "sidestream" from tobacco smoke.



Tobacco smoke contains about 3,800 chemical compounds including benzene and other carcinogens. People exposed to sidestream smoke often absorb nicotine, carbon monoxide, and many of the additional noxious compounds in concentrations higher than the smokers. In 1986, a National Research Council review of studies on passive smoking estimated that nonsmoking spouses of smokers face a 30 percent increase in their chance of incurring lung cancer, in comparison to spouses of nonsmokers. The risk of respiratory problems for smokers' children increases 20 to 80 percent.

While federal policies have been evolving, 42 states have passed laws that limit or prohibit smoking in public places. These laws range from a simple ban on smoking in school buses to comprehensive clean indoor air laws that limit or prohibit smoking in virtually all public places. Connecticut was the first state to require restaurants to have nonsmoking sections in 1974.

Minnesota passed the first law to protect nonsmokers in workplaces and public buildings in 1975. The law prohibited smoking except in designated areas and was considered a model statute for other states. The state of Michigan included smoking laws in its Clean Air Act in 1986, establishing nonsmoking as the norm by extending regulations beyond government offices and workplaces to theaters, health facilities, auditoriums, and many other types of public buildings.

Today, 20 states currently have comprehensive clean indoor air laws and 22 restrict smoking in public or private workplaces. One of the current trends is for more

INDOOR POLLUTION MATRIX

	1 STATE NO-SMOKING LAWS	2 STATE CIGARETTE TAX	3 MILLIONS OF PACKS SOLD	4 RADON PROGRAM/ FULL TIME EMPLOYEES/ RADON APPROPRIATION ($)	5 FREE OR SUBSIDIZED RADON TESTING/ EDUCATIONAL INFO.	6 TERRADEX CORP. TEST RESULTS/ PERCENT GREATER THAN 4 PCi/l	7 CHILDHOOD LEAD SCREENING/ CONFIRMED ELEVATED LEVEL	8 BAN ON LEAD IN DRINKING WATER SYSTEMS	9 HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS
Alabama	0	.165	467.7	D/3/$75	-/Y	59/32.2	-	P	
Alaska	3	.16	65.2	F/.25/0	X/Y	536/17	*	O	S
Arizona	2	.15	341.8	F/1/$58	-/N	5/ 40	-	I	
Arkansas	1	.21	297.7	I/<.O1/0	-/N	89/18	4355/135	D	
California	3	.10	2612.1	F/.75/$109	-/D	689/4.5	U	I	C/L
Colorado	3	.20	353.7	D/.25/0	-/Y	287/45.6	96/0	D	
Connecticut	4	.26	344.2	D/5.5/$400	-/Y	173/19.7	U	I	S
Delaware	1	.14	88.4	F/.3/$10	X/N	47/12.8	5509/87	I	
Florida	4	.24	1407.5	O/2.5/$1000	X/Y	247/11.3	25630/U	I	S
Georgia	1	.12	770.2	F/1/O	-/N	73/13.7	7802/77	P	
Hawaii	2	.30	64.5	I/<.O1/0	-/N	1/0	-	I	
Idaho	3	.18	97.3	F/1.5/0	-/D	791/41	2831/0	O	
Illinois	0	.20	1361.9	D/3.25/$130	-/N	796/26.6	70976/1300	I	
Indiana	2	.155	757.6	D/2.5/0	X/D	184/35.9	5333E/U	I	
Iowa	2	.26	300.9	F/1/$123	-/N	74/35.1	U	O	
Kansas	2	.24	267.7	D/1/0	-/Y	13/23.1	5861/41	P	
Kentucky	1	.03	670.5	D/2/0	-/N	107/28	7103/90	D	
Louisiana	0	.16	543.2	I/.1/0	-/N	25/4	61822/229	D	
Maine	4	.28	138.5	O/3.5/O	X/Y	1496/23	*	I	
Maryland	2	.13	535.1	D/2/0	-/N	208/26.9	*	I	
Massachusetts	2	.26	674.4	F/1.5/O	-/Y	231/16	135000/686	I	C/L
Michigan	3	.21	1151.5	D/1.5/0	-/Y	95/22.1	41864/466	P	S
Minnesota	4	.38	439.4	F/.5/O	-/Y	255/36.1	U	I	S
Mississippi	1	.18	295.8	I/<.O1/O	-/N	15/0	-	D	
Missouri	0	.13	648.6	F/.1/O	-/N	64/9.4	11573/1900-UC	P	
Montana	4	.16	80.9	F/.25/O	-/N	326/33.1	*	D	
Nebraska	4	.27	165.7	F/.25/O	-/Y	15/33.3	1953/43	D	
Nevada	2	.20	132.6	I/<.01/O	-/N	313/14.1	U	P	
New Hampshire	2	.17	195.4	F/1/$105	X/N	97/39.2	2103/0	I	S
New Jersey	4	.27	873.4	O/26/$4340	X/Y	4648/25.5	51260/U	I	
New Mexico	3	.15	127.7	F/1.5/0	-/N	633/25.8	-	I	C/L
New York	2	.21	2025.5	O/19/$7867	X/Y	4945/11.8	196043/2270-UC	I	C/L
North Carolina	0	.02	965.7	F/NA/0	-/Y	93/12.9	12118/43	I	
North Dakota	3	.27	68.4	F/1/O	-/Y	53/28.3	479/0	I	
Ohio	2	.18	1358.6	F/1.5/O	-/Y	432/38.7	22691/U	O	S
Oklahoma	2	.23	394.6	F/.125/O	-/D	22/18.2	-	I	
Oregon	3	.27	300.8	F/.05/O	-/N	5896/4.9	-	I	C/L
Pennsylvania	2	.18	1351.4	O/21/$5300	X/Y	22325/56.8	20047/394	P	
Rhode Island	2	.25	132	D/.33/O	X/N	31/22.6	12418/172	I	S
South Carolina	1	.07	423.7	F/.5/0	-/N	26/3.8	45775/108	D	
South Dakota	2	.23	68.8	I/.5/O	-/N	606/28.2	*	D	
Tennessee	0	.13	612.9	D/3/$150	-/N	540/25	-	D	
Texas	2	.205	1845.9	I/.O625/0	-/N	468/.6	U	I	S
Utah	4	.23	107.7	F/.5/$38	-/Y	29/17.2	U	D	
Vermont	1	.17	70.2	F/.25/0	-/Y	71/23.9	-	P	S
Virginia	0	.025	774.8	D/2.5/0	X/Y	526/13.7	2359E/37E	I	C/L
Washington	4	.31	415.4	F/1/$50	-/Y	11775/3.8	U	I	C/L
West Virginia	1	.17	217	F/.4/0	-/N	15/20	-	I	
Wisconsin	3	.30	503.6	D/2.25/$25	-/N	236/18.6	5502/210	I	S
Wyoming	0	.08	63.4	D/2/0	-/Y	136/47.8	-	P	

stringent restrictions from local governments and private companies. More than 200 cities and counties have limitations on smoking in public places. And continued expansion of state prohibitions is likely.

In the largest radon study to date, EPA tested 11,600 homes in 10 states and found 21 percent with elevated levels of radon.

Radon is a more recent issue. For cigarette smokers, regular exposure to high levels of radon multiplies the risk of lung cancer by a factor of 10 compared to non smoking risk, according to the National Research Council. What makes radon a problem are the heavy metals of lead, polonium, and bismuth it decays into, as well as the ionizing radiation it gives off. Ultrafine particles of radon are electrostatically charged and attach themselves to smoke, dust, clothing, furniture, and walls. If inhaled at excessive levels or for prolonged periods, they can damage lung tissue. EPA considers radon second only to smoking as a cause of lung cancer.[27]

There are three primary sources of radon: soil and rocks (particularly granite, other uranium-bearing rock, and phosphate rock), water, and nuclear wastes. The federal government and a few state governments have known for a decade of potential problems with indoor radon. One of the first broadly recognized incidents of radon contamination was in Grand Junction, Colorado, in the late 1970s. As many as 10,000 homes, stores, and schools were built in the 1950s and 60s using uranium mine tailings, a grey sandy material left over after refining uranium ore. Mixed with cement for foundations and walls, the tailings released high concentrations of radon into the buildings.

The attention given to Stanley Watras' home in Pennsylvania alerted the public to a much broader problem from naturally occurring radon. Hotspots of radon concentrations are often found in geologic deposits of granite, shale, phosphate, and uranium bearing-rock formations and soil. These hotspots have been found in more than 22 states spanning the country. One study has discovered 21 hot properties with excessive radon concentrations in midtown Manhattan.

In the largest radon study to date, EPA tested 11,600 homes in 10 states and found 21 percent with elevated levels of radon. Although there are no official federal standards for radon contamination, a level of 4 picocuries per liter (pCi/l) has been established as a remedial action measure for exposure in the home by EPA. But it is considered an economically-based health standard rather than a threshold measure of health risk. As many as eight to 12 million homes may have levels above 4 pCi/l and costs could range above $4 billion for installation of ventilation, sealing cracks in basements, and removal of soil.[28]

The federal government is reluctant to get involved in the issue beyond monitoring and research. Ironically, the federal government supplied more than $123 million in subsidies to the tobacco industry in 1986, but appropriated only $8 million for radon.[29]

Following the lead of Pennsylvania, some states have begun offering low-interest loans for home repairs. Eleven states are offering free or subsidized testing of homes. And 22 states offer educational materials. Five states—Florida, Maine, New Jersey, New York, and Pennsylva-

MATRIX KEY

1. State No-Smoking Laws: scale of 1-4 indicates extent of restrictions on smoking in public places, transportation, workplaces; "4" signifies most comprehensive.

2. State Cigarette Tax: tax in each state as of 9/87 (note: there is an additional $.16 federal tax).

3. Millions of Packs Sold: number sold as recorded by state taxes paid (1986).

4. Radon Program/Full-Time Employees/Radon Appropriations ($): "I"—information program only, "F"—distributes information and more extensive program information, "D"—same as "F" and funds allocated, "O"—fully operational testing, information, and training program; appropriation figures in $000's.

5. Free or Subsidized Radon Testing/ Educational Information: "X"—offers free or subsidized testing, "Y" distributes state information, "N"—does not distribute state information, "D"—developing state educational materials.

6. Terradex Corp. Test Results/ Percent Greater than 4 pCi/l: database of tests from 1980 through Sept. 1987.

7. Childhood Lead Screening: Confirmed Elevated Level: number of children age 1-5 years screened for lead poisoning/number with confirmed lead toxcicity; "*"—did not report data, "U"—data reported unobtainable by state repondent, "UC"—under care; "E" estimated by respondent.

8. Ban on Lead in Drinking Water Systems: "P"—state in process of implementation, "D"—will meet 6/19/88 EPA deadline, "I" lead ban implemented, "O"—no information available.

9. Household Hazardous Waste Collection Programs: "S"—statewide collection program has been used, "C/L"—county or local level program has been used.

For sources, see page 48.

nia—are conducting the most comprehensive programs.

Asbestos is another carcinogen commonly found in homes, schools, and workplaces. It is a group of minerals composed of tiny, easily inhalable fibers that can easily become airborne or carried in water. If inhaled or ingested, asbestos fibers lodge in tissue where they may cause scarring and cancer.

Asbestos has traditionally been valued for its fire-resistant properties and it is usually found as insulation around water and heating pipes. It may also be found in floor tiles, ceiling panels, patching compounds, fire-resistant textiles, hand-held dryers, and other appliances.

It is estimated that about 15 million students and 1.4 million workers are exposed to asbestos in schools.

About 400,000 miles of asbestos/cement pipe have been used in drinking water supply systems. But over the past decade asbestos has been banned for use in certain pipe coverings, patching compounds, and artificial fireplace logs. All uses of asbestos are expected to be banned over the next ten years. School buildings are the first institutions targeted for action.

It is estimated that about 15 million students and 1.4 million workers are exposed to asbestos in schools. In 1986, Congress passed the Asbestos Hazard Emergency Response Act, requiring all public and private schools to be inspected and state governors to submit asbestos management plans by October 1988. Implementation of the plans must start by July 9, 1989 and be completed in a timely fashion. EPA has awarded grants to 12 states to support costs for inspection and development of management plans.[30]

Other states are moving quickly to pass asbestos-related legislation. One of the largest dangers is improper removal of asbestos. Currently 39states require some form of accreditation of asbestos removal contractors. Several states offer educational material to citizens, and Rhode Island has declared an effort to make its buildings "the most asbestos-safe in the United States." Free educational classes have been held in every community.

Lead is another toxic commonly found in homes. EPA has estimated that one in five Americans drink water contaminated with unsafe levels of lead.[31] Those at greatest risk are children whose bodies absorb a higher percentage of lead ingested. Chronic exposure to low levels of lead contamination can damage the brain and nervous system of a child and cause an array of effects and symptoms for adults, including poor appetite, fatigue, and diminished mental capacity. The agency has proposed cutting by more than half the amount of lead (from 50 parts per billion to 20 parts per billion) in drinking water. But this alone will do little to address the problem. Most lead gets into water as it passes through water system pipes, or pipes in the home. Federal law requires that water be tested only in reservoirs, water towers, and other places were public supplies are stored.

The Safe Water Drinking Act amendments passed in 1986 require state governments to ban certain uses of lead in plumbing and to revise standards for other uses. States have until June 1988 to implement and enforce these new limitations. Twenty-six states have already banned the use of lead in drinking water systems. Six states—Maryland, Vermont, Minnesota, Colorado, Massachusetts, and Utah—have begun special monitoring to pinpoint problem areas with high lead levels.

Lead paint also covers 25 million housing units and many older homes have lead paint on interior surfaces. Young children are in danger of playing in soil contaminated with lead paint chips or ingesting them. Since the early 1970s, as many as 40 states have organized programs to conduct blood -lead screening tests on children in areas with deteriorating housing stocks. Major cities, such as Baltimore, New York, and Boston, are widely recognized as having model programs. In 1982, federal funding for lead screening programs was cut and many of the programs have been eliminated or vastly reduced in size.

The overall problem with lead is that so much of it is used. It ranks fifth among tonnage of all metals used in the U.S. Not only is it toxic, but it it accumulates in the body. In addition, water and lead paint, airborne lead pollution from motor vehicle exhaust and other sources contributes to the problem and can deposit significant amounts of lead on food, another source of continual low-level exposure.

In April 1987, EPA upgraded the classification of formaldehyde from a "possible" carcinogen to a "probable" carcinogen.

Another emerging issue is formaldehyde contamination. Formaldehyde is found in the resins used in more than 3,000 products including building materials such as particle board, cosmetics, insulation, toothpaste, and new car interiors. It is highly prized by the chemical industry as a preservative and bonding agent. The problem is that formaldehyde breaks down and gives off a toxic gas.

Materials containing formaldehyde emit the highest levels of gas

when new, but continue to emit vapors for years. Often it gives off a pungent, pickle-like odor. It is a known irritant to skin, eye, nose, and throat and has also been associated with difficulties in breathing, nosebleeds, and various asthma-like reactions, headaches, fatigue, menstrual problems, and nausea. The National Research Council estimates that as much as 10 percent of the population in the United States may be hypersensitive to formaldehyde, even at low levels of concentration.

In April 1987, EPA upgraded the classification of formaldehyde from a "possible" carcinogen to a "probable" carcinogen.[32]

There is a need for cataloging and timely action on all indoor pollutants. No-cost measures such as warning labels on products containing formaldehyde, requirements for homes to be tested for radon or lead pipes or paint before a sale can be transacted, and removal of government subsidies for the tobacco industry, are among initial steps that can be taken. Additional steps for programs needing funds, such as monitoring, cleanup, and screening programs, could be balanced on the cost of water, licenses for cleanup contractors or similar fees and taxes on tobacco and other products.

Above all it is essential that the federal government maintain a strong role for research, technical support, the formulation of minimum standards, and deadlines for action by the states.

INDOOR POLLUTION SNAPSHOT

New Jersey represents some of the most extensive programs to eliminate indoor pollution. The state is among those with the best developed policies to limit smoking. Protected areas include restaurants, workplaces, government buildings, public transportation, and health facilities. The state also has an operational program to address problems with radon with the Department of Environmental Protection, Department of Consumer Affairs, and Department of Occupational Health cooperating on the effort.

The state distributes educational materials and provides free screening for homeowners and low-interest loans for improvements to alleviate the problem.

New Jersey has also implemented a ban on the use of lead in drinking water systems and conducted testing of children for elevated blood lead levels.

Currently:

- nine states have the most developed no-smoking regulations for a variety of public buildings, public transportation, restaurants, and workplaces;
- five states have operational radon programs that offer free or subsidized testing of homes and distribution of educational materials;
- 15 states offer only education materials on radon;
- 26 states have implemented bans on the use of lead in drinkingwater systems;
- 18 states have had state, county, or local household hazardous waste collection programs.

HIGHWAY SAFETY

...highways are one of our most dangerous daily environments.

***A**uto accidents are recognized as the leading cause of death for Americans under the age of 35.*

On April 1987, a new federal law allowed states to determine whether or not to raise speed limits to 65 miles per hour. New Mexico, a state with one of the nation's highest auto death rates, was the first to raise the speed limit on sections of its rural interstates. Thirty-eight other states followed. Initial figures from April to August show traffic deaths for those rural interstates in New Mexico have more than doubled since the increase.[33] An increase of more than 50 percent occurred in 22 other states that raised their rural speed limit.

Although not traditionally considered an environmental issue, highways are one of our most dangerous daily environments. Auto accidents are recognized as the leading cause of death for Americans under the age of 35. More than 47,800 people were killed in traffic accidents in 1985. Another 300,000 were injured.

The automobile is also the machine with the single greatest impact on our environment. It helped give birth to the sprawl of suburbia. It has laced our cities and countryside with nearly four million miles of roads. It accounts for more than half of our total petroleum use each year. And its exhaust has laden the air with carbon monoxide, lead, sulphur dioxide, benzene, and other chemicals hazardous to human health.

How policymakers promote safe and efficient use of highway transportation is an issue of growing urgency. In addition to a rising death rate on the roads, 40 percent of the nation's bridges are in poor condition. More than a million miles of roads will need resurfacing by the year 2000. Travel on urban freeways is expected to increase by nearly 50 percent over the next 20 years, increasing the amount of time and fuel and user costs wasted in traffic jams by 400 percent. Sixty-two major cities have ozone pollution levels violating federal standards. And while fuel efficiency has increased from an average of 13 miles per gallon in 1978 to 18 miles per gallon today, standards for new cars have been frozen. The result is not only unnecessary fuel consumption and increased air pollution, but pressures to import more oil and drill in environmentally sensitive areas such as the Arctic National Wildlife Refuge.

The nation's modern highway system began in the 1940s with a grand plan called the System of Interregional Highways, later changed to the Interstate Highway System. The conventional wisdom of the 1940s and 1950s called for a pattern of radial routes around cities with a ring road at the urban fringe around which jobs and development flourished.

The development of the system was supported by the Federal Highway Trust Fund passed in 1956. The law placed a federal tax on gasoline and channelled the funds into a federal-state cost sharing program. As the Interstate highway system expanded in the 1960s and 1970s and the number of cars and trucks on the road multiplied, Congress passed more laws to address transportation issues: the Urban Mass Transportation Act in 1964, the Clean Air Act in 1965, the Highway Safety Act in 1966, the National Environmental Policy Act in 1969, and the Hazardous Materials Transportation Act in 1975. Like the Highway Trust Fund and most federal laws, they included partnership arrangements with the states. But it was a partnership in which the federal government played the dominant role.

Today, the federal-state partnership is changing. The federal government is withholding funds

from the Highway Trust Fund on many projects because of federal deficit concerns. And the states are taking on increased responsibilities for air pollution controls, hazardous material transport, mass transportation, and urban congestion.

The shift is coming at a time when costs of repairing and maintaining roads are expected to increase. Many roads are now 25 to 50 years old and were not built to withstand current loads. More than one mile out of every 10 of the 43,593 mile Interstate system is in poor condition.[34]

Kansas has the most significant problem with 67.7 percent of its rural Interstates considered deficient, and 63.1 percent of urban Interstates in poor condition as well. Also high in deficient Interstate roads are Rhode Island, Missouri, New Mexico, and Oregon. Washington state, Maryland, and North Carolina are among the states with the lowest percentage of deficient Interstate roads.[35]

The condition of roads is a primary factor in auto safety. An additional concern is the number of bridges needing repair. Like the Interstate highway system, many bridges are more than 25 years old. Out of a total of 575,607 bridges nationwide, 131,562 are considered structurally deficient and 112,084 are functionally obsolete. In Connecticut, Kentucky, Missouri, and Montana, more than 60 percent of the bridges have been neglected. New York has the highest proportion—67.4 percent. It is estimated that it will take more than $50 billion to conduct the necessary repairs on all of the bridges in poor condition.[36] With traditional federal revenue sharing that many localities used for road and bridge

HIGHWAY TRANSPORTATION MATRIX

	1 TOTAL HIGHWAY FATALITIES	2 FATALITIES PER 100 MILLION VEHICLE MILES TRAVELED	3 ACCIDENTS INVOLVING HAZARDOUS MATERIALS NOTIFICATION REQUIREMENTS	4 SEAT BELT LAWS/ PENALTIES/ ENFORCEMENT	5 SPEED LIMIT (MPH)	6 MOTOR VEHICLE INSPECTION/ MAINTENANCE PROGRAM	7 PERCENT DEFICIENT RURAL INTERSTATE MILEAGE/ PERCENT DEFICIENT URBAN INTERSTATE MILEAGE	8 PERCENT DEFICIENT BRIDGES	9 DRUNK- DRIVING LAWS	10 COORDINATION OF RURAL MASS TRANSIT PROGRAMS	11 MASS TRANSIT EXPENDITURE (PER CAPITA $/ (PER MILE OF TRANSIT $)
Alabama	1,081	2.9	41	N	65	N	.3/0	47.7	0	0/2/0/4	.08/.02
Alaska	101	2.5	14	N	55	N/C	29.1/52.4	11.2	0	0/0/0/0	0/0
Arizona	1,004	4.5	30	N	65	B/C	4.7/15.3	7.2	2	-	5.76/.16
Arkansas	602	3.4	23/X+	N	65	P	3.3/7.3	48	1	1/2/-/4	.13/.02
California	5,253	2.4	105	Y/P/2	65	R/C	4.9/7.8	26	4	1/2/3/4	25.62/.14
Colorado	603	2.3	44/X	Y/P/2	65	B/C	7.8/2.5	36.3	2	1/2/-/4	28.06/.41
Connecticut	450	2	26	Y/P/1	55	R/S	0/.9	63.2	1	*/0/0/4	37.53/.80
Delaware	136	2.5	8/P	N	55	P/C	NA/O	19.2	1	1/2/3/4	10.88/.28
Florida	2,831	3.1	58	Y/P/2	65	N	4.1/0	23.3	0	1/2/3/4	.85/.02
Georgia	1,530	2.6	59/X+	N	55	B/C	0/0	43.7	0	1/0/3/4	25.67/.28
Hawaii	120	1.7	2	Y/P/1	55	P	0/0	27.3	4	0/2/0/4	0/0
Idaho	258	3.2	11	Y/P/2	65	B/C	14.4/12.7	29.3	2	0/2/3/0	0/0
Illinois	1,596	2.2	91/X	Y/P/2	65	L/C	4.3/11.6	31	2	1/2/-/4	14.66/.05
Indiana	1,038	2.4	66	Y/P/2	65	B/C	8.2/4.5	51.2	1	-/2/-/-	2.37/.08
Iowa	441	2.1	22	Y/P/1	65	L	3.1/7.8	49.3	3	1/2/-/4	.83/.08
Kansas	500	2.5	38	Y/P/2	65	R	67.7/63.1	52.2	2	0/0/0/4	0/0
Kentucky	805	2.7	34	N	65	R/C	3.3/12.5	62.1	2	0/0/3/4	.21/.01
Louisiana	932	2.7	69/X	Y/P/2	65	P/C	1.4/4.0	46.4	0	0/2/0/0	0/0
Maine	212	2.2	10/X	N	65	P	7.3/10.8	30.4	2	1/2/0/4	1.50/1.08
Maryland	784	2.2	46/P+	Y/P/2	55	L/C	O/.9	35.7	3	1/2/3/4	12.15/.14
Massachusetts	749	1.8	29/X	N	55	P/S	3.5/1.8	34.7	2	0/2/3/4	55.31/.31
Michigan	1,594	2.3	32/P+	Y/P/2	65	R/C	27/22.4	29.1	2	1/*/0/4	10.81/.23
Minnesota	571	1.7	29	Y/1	65	R	5/5.9	29.2	3	-	5.86/.08
Mississippi	771	3.9	23	N	65	P	28.4/35.8	54.1	1	-	0/0
Missouri	1,129	2.7	59	Y/P/2	65	P/C	34/25.5	63.3	0	1/2/0/4	0/0
Montana	222	2.9	18	Y/P/2	65	N	6.1/4.3	60.2	3	1/0/3/0	.09/.05
Nebraska	290	2.3	15	N	65	N	9.5/2.7	59.2	2	1/2/0/4	.88/.04
Nevada	233	2.9	15	Y/P/2	65	L/C	10.3/0	16.1	2	-/-/3/4	0/0
New Hampshire	172	2.1	7/+	N	65	P/C	0/0	46.2	2	-	0/0
New Jersey	1,039	1.9	49/P+	Y/P/2	55	P/S	10.1/7	35.2	2	1/2/0/4	39.46/.08
New Mexico	499	3.7	13	Y/P/1	65	L/C	36/22.7	17.8	1	0/2/0/4	0/0
New York	2,115	2.3	77/P+	Y/P/1	65	P/C	4.1/6.8	67.4	2	1/2/0/4	55.79/.08
North Carolina	1,647	3.2	36	Y/P/1	65	P/C	1.8/4	56.8	3	1/2/0/4	.16/.02
North Dakota	100	1.8	19	N	65	N	0/0	53	3	0/2/0/0	0/0
Ohio	1,673	2.1	98	Y/P/2	65	R/C	4/21.9	21.3	1	0/2/0/4	2.84/.04
Oklahoma	698	2.3	40	Y/P/2	65	P/C	17.3/25	56.1	2	0/0/3/4	.27/.02
Oregon	619	2.7	23/+	Y/P/1*	65	R/C	34.6/26.5	18.4	3	0/0/0/4	3.43/.05
Pennsylvania	1,894	2.4	123	Y/P/2	55	P/C	17.9/11.9	35.5	3	1/2/0/4	19.12/.13
Rhode Island	124	2	5/X	N	55	P/S	57.1/28.6	21.5	2	0/2/0/4	8.99/.06
South Carolina	1,059	3.9	19	N	65	P	3.9/2.7	20.6	3	1/2/0/4	.32/.09
South Dakota	134	2.1	2	N	65	B	0/0	48.4	2	0/2/3/4	0/0
Tennessee	1,230	3.2	32	Y/P/2	65	N/C	9.5/0	46.1	2	-	1.58/.06
Texas	3,567	2.4	147	Y/P/1	65	P/C	5.2/17.4	35.1	0	0/2/0/4	.59/.01
Utah	313	2.5	25	Y/P/2	65	P/C	6.8/.8	14.6	4	-	13.93/.28
Vermont	109	2.2	7	N	65	P	9.7/20	43.5	2	1/2/3/4	.49/.04
Virginia	1,126	2.2	45/X	Y/P/2	55	P/C	6.3/8.4	32.5	2	1/2/0/4	9.23/.36
Washington	703	1.9	26	Y/P/2	65	R/C	0/1.7	27.3	4	0/2/-/4	17.33/.11
West Virginia	440	3.3	20	N	65	P	6.4/7.8	59.6	3	-	.22/.02
Wisconsin	747	2	32	Y/P/2	65	L/C	23.2/25	46.1	3	1/2/3/4	9.08/.18
Wyoming	168	3.1	43	N	65	N	0/4	24.7	1	0/0/0/4	0/0

repair coming to an end, state and local governments will now have to consider tax increases, and in many areas repair of roads and bridges is likely to be delayed.

For many states the issue of general road conditions increases the risk in raising speed limits. Five states that raised their speed limits in 1987 had more than one third of their urban or rural interstates in poor condition.

In 1974 maximum speed limits of 55 miles per hour were introduced in every state following a federal ban on highway project assistance to states with higher speed limits. The primary purpose was to conserve fuel, but analysts at the National Safety Council believe the measure responsible for saving 2,000 to 4,000 lives each year.[37] The March 1987 federal law allowing states to raise rural speed limits up to 65 miles per hour and the subsequent rise in the death rate are particularly ironic for state officials who argued that higher speed limits are more efficient for truckers and travelers. Also ironic is the fact that under the new law there are no federal sanctions on states to enforce a speed limit set at 65 miles per hour. But states keeping a 55 mile-per-hour speed limit established under the 1974 law must show at least 50 percent compliance or risk losing federal funds.

Use of seat belts is also an important issue for states. Although many countries have had national seat belt laws since the early 1970s, the U. S. has left the issue to the states. In 1984, New York became the first of 27 states to pass a seat belt law. Within six months, New York traffic fatalities dropped 28 percent. The National Highway Traffic Administration estimates that in 1986, use of seat belts prevent 1,450 deaths and 20,000 critical injuries. Department of Transportation rules will soon require 40 percent of all new cars to have automatic restraint systems. It is estimated that if everyone in automobiles buckled up it would save 10,000 lives annually.

Five states that raised their speed limits had more than one-third of their urban or rural Interstates in poor condition.

Drunk driving is another significant issue. More than half the drivers killed each year have blood alcohol concentrations higher than the legal limit. But many states test less than 80 percent of drivers killed and under reporting by states is commonplace. As of January 1987, 45 states had laws pertaining to blood alcohol content to define driving under the influence. In 20 states, arrest for alcohol-related driving violations can result in automatic loss of a driver license independent of the outcome of criminal charges. California, Colorado, Hawaii, and Utah have the toughest regulations for drunk driving. Alabama, Alaska, Florida, Georgia, Louisiana, Montana, and Texas have the weakest.

Beyond these direct factors that contributed to the 47,800 deaths on the highways, motor vehicles carry a wide array of impacts on public health.

Motor vehicles contribute an estimated 50 percent to air pollution. Prolonged or periodic exposure to toxic chemicals can damage heart, lung, and brain tissue and, in the case of carbon monoxide, cause death.

Amendments to the Clean Air Act in 1965 authorized the Depart-

MATRIX KEY

1. Total Highway Fatalities: 1986 preliminary highway fatalities.

2. Fatalities per 100 million Vehicle Miles Traveled: 1986 preliminary data.

3. Accidents Involving Hazardous Materials/Notification Requirements: "X"—requires advance notification for transport of hazardous wastes, "+"—notification of additional hazardous materials, "P"—certain areas of the state require notification.

4. Seat Belt Laws/Penalties/Enforcement: "Y"—has seat belt law, "N"—no law, "P"—penalty/fine for violation of law, "1"—primary enforcement of law, "2"—secondary enforcement (must be stopped for another offense to be cited for seat belt violation.)

5. Speed Limits: 65 mph or 55 mph speed limit for rural interstates.

6. Motor Vehicle Inspection: "P"—periodic inspection, "R"—random , "B"—periodic inspection of school buses only, "L"—limited , "N"—no program, "S"—statewide maintenance program, "C"—selected city/county programs.

7. Percent Deficient Rural Interstate Mileage/Percent Deficient Urban Interstate Mileage: 1985 figures.

8. Percent Deficient Bridges: December 1986 DOT figures.

9. Drunk Driving Laws: scale of 0-4 indicates extent of regulatory provisions (open-container, mandatory fine for first offense, etc.).

10. Coordination of Rural Mass Transit Programs: "1"—has legislative or executive order ("*"—pending), "2"—has interagency committee or task force, "3"—interagency agreement, "4"—technical assistance (state to local gov.).

11. Mass Transit Expenditure (per capita)/Per Mile of Transit: 1987 Council of State Legislatures data.

For sources, see page 48.

ment of Health, Education and Welfare to prescribe national standards for emissions from new motor vehicles. Later amendments continued to update the requirements. Based on early programs in California, crankcase controls to reduce hydrocarbon emissions were installed starting in 1963. Exhaust controls were introduced nationwide in 1968 models, cutting carbon monoxide. Improved nitrogen oxide control systems were placed on all cars after 1973, and in 1975 catalyst or equivalent control systems were introduced to meet tougher emission standards and save fuel.

Some states feeling pressure to reduce air pollution - have turned to alcohol fuels - methanol and ethanol to help reduce exhaust emissions.

These technological improvements had a measurable impact. Between 1975 and 1984, according to EPA, the level of lead in the air decreased by 70 percent at 36 urban sites. Carbon monoxide declined 34 percent during the same period. And ozone declined 17 percent from 1975 to 1983 and remained level in 1984.

But despite this progress problems continue. Many states with cities violating air pollution standards require no periodic inspection of motor vehicles. Monitoring for air pollution is also being reduced in many areas.

And 62 major cities with excessive ozone pollution have no chance of meeting federal air standards by the end of 1988. According to EPA, it may take another 15 years for Los Angeles, 10 years for New York City, and five years for Atlanta to meet standards. EPA first threatened sanctions against the violating states, but has since retreated, allowing cities to develop their own standards and schedules with a requirement that they reduce the excessive level of toxic pollutants by three percent per year.

Some states feeling pressure to reduce air pollution, have turned to alcohol fuels—methanol and ethanol—to help reduce exhaust emissions. Colorado became the first state to require city motorists to use 10 percent alcohol-blended gasoline during winter months. California is moving ahead to use pure methanol in its state vehicle fleet, and legislation in Arizona has proposed use of alcohol fuels in state fleets.

One policy with great potential impact on fuel consumption is the setting of fuel efficiency standards for new cars and trucks. As is well known, fuel efficiencies of 40 miles per gallon are possible. The Corporate Average Fuel Economy standard law passed by Congress has helped push the average fuel efficiency for U.S. cars from 13 miles per gallon to an average of 18 miles per gallon. The law established 27.5 miles per gallon as a target. However, the Reagan administration rolled back the standard to 26 miles per gallon. Increasing the average efficiency of the U.S. fleet to 19 miles per gallon is estimated to be equivalent to more than 130 million barrels of oil per year, an amount greater than the anticipated production of new wells proposed for the Arctic National Wildlife Refuge.

Other methods of reducing pollution and fuel consumption are mass transit, car-pooling, and van-pooling. Commuting to work is the most typical use of cars, consuming 34 percent of daily automotive fuel. In 1987, 110 million Americans commuted to work in some type of public or private mode of transportation: 21.7 million used car pools or van pools, 4.5 million rode buses, 2.3 million used rail transit, and 70.8 million drove back and forth to work alone.[38]

Car-pooling and van-pooling is usually coordinated independently or by the employer. Mass transit is either a public service operated by a city or private enterprise. The city of Portland, Oregon has developed an especially good model in offering free mass transit within the city—funded by a tax on motor vehicle commuters.

Another broad public health issue for states concerns the transportation of hazardous material. More than 900 million tons of hazardous materials are shipped on the nation's highways each year. And EPA estimates that about 20,000 new compounds are given toxic designations annually.

More than 900 million tons of hazardous materials are shipped on the nation's highways each year.

Differing federal, state, and local regulation and enforcement procedures do not allow citizens to obtain adequate information on these shipments. And officials responsible for responding to accidents often lack training and accurate information.

Although some companies and private contractors employ emergency response experts, public response teams are vitally important. Firemen and police are usually the first on the scene of an accident and often have primary responsibility. In 1980, a fire chief in Somerville, Massachusetts received conflicting advice from 30 government and industry experts. When water was finally sprayed on a ruptured tank car, an acid cloud was released forcing the evacuation of 30,000 people.[39]

A few states, such as California, Illinois, New Mexico, South Carolina, and Washington have developed stiffer requirements for waste shippers. But local public response teams and further development and integration of regulations are needed at both the

federal and state levels.

As general revenue-sharing and other federal grant-in-aid programs are eliminated under the philosophy of "new federalism" and deficit reduction, maintaining the safety and quality of transportation will be increasingly difficult. New federalism advances the belief that safety on the highways is a decision to be made by individuals and states. This ignores the interstate nature of highways and the fact that even the most responsible driver can be threatened by hazardous waste accidents, poor road conditions, or drunk drivers.

Resurfacing a million miles of roads by the year 2000, repairing nearly 250,000 bridges, assuring access to mass transportation, encouraging greater fuel efficiency; and undertaking new safety initiatives for speed limits, seat belt laws, drunk driving, hazardous material transport, and air pollution reduction programs are institutional problems. Perhaps more than any other issue these problems will require a recommitment and strengthening of the federal-state partnership.

HIGHWAY SAFETY SNAPSHOT

Maryland represents consistently good quality for most of the indicators assessed for highway safety. The state Secretary of Transportation oversees a budget of $1.5 billion drawn from tolls, bonds, motor fuel taxes, a portion of the state corporate income tax, and several other sources. The department is divided into seven separate administrations: State Highways, Motor Vehicles, Maryland Port Authority, Maryland Transportation Authority, Mass Transit Administration, and State Rail Administration. The State Highway Division receives nearly three quarters of the total budget. This is reflected in the fact that there was no deficiency in rural interstate mileage, which totals about 150 miles. And less than one percent of urban interstate miles are deficient, an overall record of some of the best highway maintenance in the country. However, 35.7 percent of the state's bridges are structurally deficient or functionally obsolete, slightly less than the national average of approximately 40 percent.

Maryland requires advance notification on transport of hazardous materials in certain areas. The state has a seat belt law and has maintained its 55 mile per hour speed limit on the rural interstate. Its drunk driving laws are in the upper third in comparison to other states, and the state has declared an intent to lower the theshold for blood alcohol content levels, an area in which it has been lagging. It has some of the best integrated structure for rural mass transit and spends approximately $.14 per mile of transit.

Its highway fatality rate for 1986 is 2.2 persons per 100 million vehicle miles traveled.

Currently:

- seven states have highway fatality rates below two persons per 100 million vehicle miles traveled;
- nine states require notification on transport of a wide range of hazardous materials;
- 30 states require the use of seat belts;
- 11 states have maintained speed limits at 55 miles per hour;
- eight states have 25 percent or more of rural Interstate highway miles in poor condition;
- eight states have 25 percent or more of urban Interstate highway miles in poor condition;
- 23 states have 40 percent or more of their bridges in poor condition;
- four states have the most extensive drunk driving laws.

ENERGY POLLUTION CONTROL

Today we use 25 percent less energy for every dollar of Gross National Product than we did in 1974.

The search for sites to store and dump radioactive waste from nuclear power plants has set off a rumbling controversy in state capitals across the country. Debates in Maine and Texas and Washington brought federal siting efforts to a standstill. And selection of Yucca Mountain in Nevada as the nation's first permanent high level waste dump has set off new controversies. Difficulties are likely to intensify as storage pools at more than 40 nuclear plants reach full authorized capacity in the early 1990s, and as proposals emerge for low-level waste dumps in 10 states.

Nuclear waste is just one of the hidden costs of producing and consuming energy. From hundreds of thousands of acres stripmined for coal—to tens of thousands of unlined pits that hold oil and gas waste—to multi-billion dollar damage from acid rain and climatic change from the "greenhouse effect" of air pollution, the energy we produce and consume delivers a broad array of backend costs.

Damage that would require clean up costs of more than $20 billion dollars per year result from the usual course of operations for four traditional energy sources: coal, oil, natural gas, and nuclear power. Tragic accidents, such as oil spills, gas explosions, or releases of radioactive material, add to the bill.

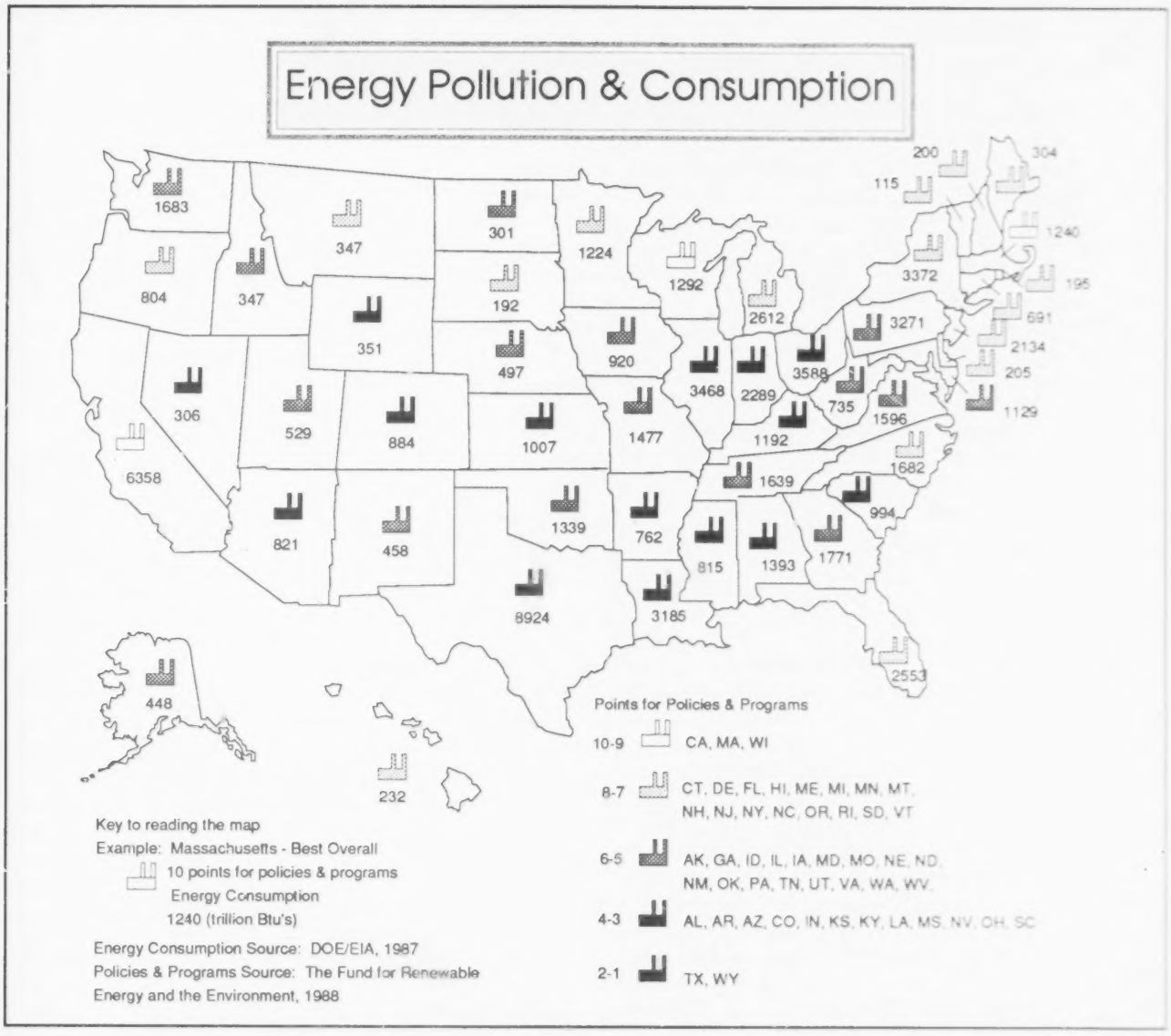
Unfortunately, the cost of this damage is often not included in energy prices. But the full cost is ultimately paid in tax money used for cleanup or continued degradation of air, land, and water, and threats to public health.

Americans currently consume about 78 quadrillion Btu's of energy each year—roughly one-third of world use. About one-quarter of this energy comes from coal. Two-thirds is from petroleum products and natural gas. The remainder comes from a mixture of wood, hydro, nuclear, and a variety of renewable energy sources. Since 1974, the demand for energy has slackened partly because of conservation and efficiency.[40] Today we use 25 percent less energy for every dollar of Gross National Product than we did in 1974. Energy efficiency—using the best available lights, motors, appliances, and other devices—has the potential to reduce our national energy bill from $400 billion a year to $270 billion or less—and provide a cornerstone for reducing the cost of pollution impacts.[41]

Development of renewable energy from solar, wind, hydro, geothermal, and a number of other sources also has the potential to help minimize the impacts of energy-related pollution. Both federal and state governments will play important roles in how much renewable energy and efficiency is pursued and how this cornerstone to reduce pollution is set.

The most fundamental need is for a change in perception. State policymakers have begun to consider innovative energy supply options in a number of states. But the full environmental costs must be added to examinations of supply and demand. Estimates of "least-environmental-damage" must be included in development of "least-cost" state energy plans.

Coal has delivered the most visible damage in strip mining and millions of tons of emissions in smoke pouring from the stacks of power plants. Sulphur dioxide and nitrogen oxide produced by burning coal is considered to be a primary cause of acid rain. About 75 percent of sulphur dioxide is estimated to come from coal-burning power plants. Annual



damage from acid rain on crops such as soybeans is estimated at $2 billion. Multi-billion dollar damage is also noted for forests, lakes, and buildings.

Most heavily hit are the Northeastern states and Canadian provinces downwind of the heavy coal consumers in the central states. Sensitivity to acid rain damage has also been found recently in Southern, Northwestern and Rocky Mountain states. Ohio (1393 trillion Btu), Pennsylvania ((1363 trillion Btu), Indiana (1192 trillion Btu), and Texas (1171 trillion Btu) consume the most energy from coal, and account for one-third of national consumption. They also account for 309 of the nation's 1,283 coal-fired power plants.

National efforts to reduce sulphur dioxide emissions by 8 to 12 million tons per year using scrubbers or low sulphur coal are expected to cost up to $6 billion dollars annually. Debates at the national level about sources of acid rain and who will pay to cap pollution contributing to it have paralyzed federal action. But individual states have begun to take action. Approximately 30 states have put acid rain research programs in place. Six states—Massachusetts, Michigan, Minnesota, New Hampshire, New York, and Wisconsin—have instituted control programs. Unfortunately, the major coal consuming states are not among those states with acid rain control programs.

One study of alternatives for reducing emissions found that states could utilize end-use efficiency—using efficient motors, lights, and appliances—to reduce acid rain emissions at the lowest cost. In examining an eight state area from Michigan to Virginia, the study showed that, by using aggressive end-use efficiency

ENERGY AND POLLUTION MATRIX

	1 ENERGY CONSUMPTION (TRILLION BTU)	2 OIL PRODUCTION (THOUSANDS OF BARRELS)	3 NATURAL GAS PRODUCTION (MILLION CUBIC FEET MARKETED)	4 NUMBER OF OIL AND GAS WASTE SURFACE IMPOUNDMENTS	5 ACRES SURFACE MINED ACRES RECLAIMED	6 ACID RAIN RESEARCH AND CONTROL PROGRAMS	7 NUMBER OF NUCLEAR PLANTS IN OPERATION/ NUMBER UNDER CONSTRUCTION	8 DATE HIGH LEVEL RAD-WASTE STORAGE POOL WILL FILL TO AUTHORIZED CAPACITY	9 HIGH LEVEL AND LOW LEVEL RAD-WASTE FACILITIES	10 LEAST-COST POLICIES	11 RENEWABLE ENERGY TAX CREDITS
Alabama	1393	21122	107211	ND	196957/321505	R	5/2	1991-1994		3	
Alaska	448	681310	306468	385	1000/0	R				3	
Arizona	821	161	A	ND			3	1993, 2003	C	3	ex 12/87
Arkansas	762	15778	132470	25,000	2950/515		2	1998, 2003		2	
California	6358	406665	469444	ND		R	6	1987-2000	C	1	ex 12/86
Colorado	884	29309	158456	4,500	55898/496		1	ND	C	3	ex 12/86
Connecticut	691					R	4	1991-1994		2	ex 12/86
Delaware	205									3	open end
Florida	2553	9383	8914	4			5	1993-1997		1	
Georgia	1771						3/1	1991		3	12/89
Hawaii	232									3	12/92
Idaho	347								H	2	open end
Illinois	3468	27245	A	ND	119981/20626	R	12/1	1988-2003	C/L/H	1	
Indiana	2289	4759	A	ND	304285/15050	R				2	ex 12/87
Iowa	920				11298/2016	R	1	1998		1	
Kansas	1007	67304	448334	1,381	10903/6120		1	ND		3	
Kentucky	1192	6475	A	ND	453894/347192	R			L	3	ex 12/86
Louisiana	3185	512108*	4888512	20,000	29634/59		2	1993, ND		3	
Maine	304					R	1	1987		1	12/88
Maryland	1129		A	3	6854/15378	R	2	1991		2	
Massachusetts	1240					R/C	2	1990, 1993		2	12/91
Michigan	2612	25688*	127008	ND		R/C	5	1993-2002	C	3	12/88
Minnesota	1224					R/C	3	1993-1999		2	
Mississippi	815	29997	142716	299			1	1993		3	
Missouri	1477	110	A	ND	55455/7982	R	1	1993		2	
Montana	347	27072	49491	ND	43684/57					2	12/93
Nebraska	497	7098	A	726			2	1996	C		ex 12/85
Nevada	306	2907		2		R			C/L/H	1	
New Hampshire	200					C	0/1			2	
New Jersey	2134					R	4	1990-2004		2	
New Mexico	458	75712	7098883	15,761	112091/21217	R				2	12/89
New York	3372	853	A	ND		C	6/1	1992-1996	L/H	2	
North Carolina	1682					R	5	1992-2010	C	2	open end
North Dakota	301	45628	59605	ND	53128/6205	R				3	open end
Ohio	3588	13442	A	5,180	144293/171246	R	2/1	1993, ND		2	
Oklahoma	1339	149105*	1917490	6,735	97034/36133					3	12/90
Oregon	804		A	ND			1	1993		1	12/90
Pennsylvania	3271	3783	A	19,702	211443/122411	R	8/1	1991-1997	C	2	
Rhode Island	195					R			C/L/H	3	6/90
South Carolina	994						7	1991-2008		2	open end
South Dakota	192	1586	A	ND		R				3	
Tennessee	1639	644	A	3,400	32292/15618	R	2/2	1994			
Texas	8924	839606*	6092105	5,500	139990/46076	R	0/4			1	
Utah	529	39172	88129	ND	3076/49					3	12/90
Vermont	115						1	1992		1	
Virginia	1596	18	A	3	36166/53307	R	4	1987-1993		2	ex 12/86
Washington	1683				14591/9	R	2/2	1993, ND	L/H	2	
West Virginia	735	3145	130058	ND	136883/174046	R				3	
Wisconsin	1292					R/C	3	1992, 1995		1	
Wyoming	351	121337*	495459	ND	329884/2694					3	

measures, no new power plants would be needed until 2005, and the plants contributing the pollution most expensive to control could be shut down.[42]

There are also serious adjustments needed for stripmining that has left tens of thousands of acres of highwalls exposed, trees and topsoil buried in waste, hillsides eroded, and streams and rivers clogged with sediment and polluted with acid drainage.

In 1977, Congress passed the Surface Mining Control and Reclamation Act (SMCRA) to halt the growth in acreage of coal-mined land left abandoned. The law established a coordinated effort between the states and the federal government with national standards and procedures for issuing permits and a program for reclamation of abandoned lands. One of the most important provisions requires mine operaters to post a bond to cover reclamation costs of the land. The bond is released when reclamation is completed or making satisfactory progress.

Twenty-two states have developed legislation and regulations and gained federal approval to operate SMCRA programs. Nine states with coal reserves have not proposed programs. And eight states with programs also have cooperative authority to oversee mining operations on federal land.

In an atmosphere of deregulation, progress under the act has been mixed at best. Both the General Accounting Office and environmentalists have fired heavy criticism at the program. The National Wildlife Federation says that because of a lack of enforcement and oversight from federal officials, implementation of the act in most states, particularly in Appalachia and the Midwest, is failing.[43]

The GAO points out that only 13 of the 22 states operating their own programs had established a specific deadline for taking action—such as criminal charges, injunctions, and suspension of a mining permit—against unabated violations. Reclamation bonds have also been criticized for being issued at levels three or four times less than what is needed for final site restoration.[44]

The federal Office of Surface Mining estimates that between 1978 and 1986, more than 2.6 million acres of land had been surface mined for coal.[45] About half—1.4 million acres—had been reclaimed, or was in the process of being reclaimed. A few states, such as Alabama and Ohio, reclaimed more land than was mined within their borders during that period. Approximately 1.1 million acres of coal-mined land was considered abandoned and needing reclamation. The average reclamation costs for the Soil Conservation Service ran more than $7,000 per acre in 1987. At this rate, the total cost of restoring the abandoned land alone would be more than $7 billion.[46]

Federal energy policy, which sets the context for state actions, currently assumes the U.S. will see increased coal production both for export and domestic use and for increased coal consumption to meet growing electric energy needs. Without federal acid rain legislation, without state caps and emission monitoring programs, and without strengthened enforcement of SMCRA and adequate reclamation bonding, the damage from coal production and consumption is likely to increase—raising the ultimate costs to be paid by the environment and public health.

The environmental damage from production of oil and natural gas is not as visible as the damage from coal production, but serious threats exist beyond widely

MATRIX KEY

1. Energy Consumption: 1985 trillion Btu, combines coal, petroleum, natural gas and electricity from non-fossil fuel sources.

2. Oil Production: 1986 thousands of barrels, "*" indicates preliminary data.

3. Natural Gas Production: 1986 million cubic feet marketed data, "A" indicates minor producer.

4. Number of Gas and Oil Surface Impoundments: estimated number of oil and natural gas surface impoundments (pits and ponds) in each state, "ND"—state lacking data.

5. Acres Surface Mined/Acres Reclaimed: 1978-1986 DOI Office of Surface Mining cumulative figures.

6. Acid Rain Policies: "R"—research program in place, "C"—control program for acid rain pollutants in place.

7. Number of Nuclear Plants in Commercial Operation/Number Under Construction: January 1988 status.

8. On-Site High-Level Radioactive Waste Storage Pool to Meet Authorized Capacity: dates compiled from 1986 NRC data.

9. High Level and Low Level Rad Waste Facilities: "C"--low level facility planned as part of compact, "L"--low level facility in operation or closed, "H"--high level facility in operation or closed.

10. Least-Cost Policies: "1"—comprehensive regualtory authority and policies in place requiring integrated planning and investment by utilities, "2"—state has made some progress toward least-cost planning and has some control over utility investment, "3"—state has made little progress in implementing policies and developing authority to encourage least-cost electrical strategies.

11. Tax Credits: "ex"--date credits expired, "open end"--provision has no expiration.

For sources, see page 48.

reported accidents, such as tanker spills and explosions, particularly to groundwater in the 33 states that produce oil or gas.

Most of the production of oil and natural gas in the United States comes from six states: Alaska, California, Louisiana, Oklahoma, Texas, and Wyoming. A quiet and pervasive problem is what to do with wastes from drilling and production that often contain toxic chemicals. The traditional method is to store drilling wastes and produced water in "surface impoundments"—pits and pools that often have no lining. The wastes are usually dumped on land, on roads, in surface water, or injected into spent wells or waste wells when the pits and ponds are cleaned out.

State figures supplied to EPA show more than 100,000 oil and natural gas surface impoundments nationwide.[47]

States generally have only conditional liner requirements for the pits and Kansas is the only state that strictly requires liners for all produced water pits. Field inspection and enforcement also vary. Sixteen producer states have no state field inspectors and rely on federal inspectors from the Bureau of Land Management, who are often shared between states.[48]

Dumping oil and gas wastes into unlined pits has contaminated groundwater in many areas. Drinking water supplies, irrigation, and livestock have been threatened with contamination from toxic substances, such as arsenic, lead, cadmium, and benzene. Releases of oily wastes in California have resulted in the deaths of wildlife.

Environmentalists fear that widespread contamination of groundwater can result from oil and gas waste surface impoundments, dumping of wastes, and discharge of produced water. They have urged that oil and gas waste be regulated as toxic substances under federal law, and an exemption for these specific wastes removed. EPA, however, has estimated that as much as 70 percent of the waste would be reclassified and cost consumers $6.4 billion per year. The agency has recommended against placing the wastes under the Resource Conservation and Recovery Act.

In order to address threats of oil and natural gas production, stricter liner regulations should be put in place by each state and oil and gas wastes need to be included under the category of toxic substances. The pressures for production should also be lessened by undertaking efforts to minimize consumption.

Our most refined energy source, and one that threatens the greatest environmental damage, is electricity. About half of electric production comes from coal. Oil accounts for about four percent and natural gas ten percent. In addition to these sources, hydro, geothermal, nuclear, and renewable energy, such as wind and solar contribute to electric supply. The most controversial source by far is nuclear.

At the end of 1987, there were 107 nuclear plants in commercial operation in 32 states and another 14 plants still under construction. Nuclear contributed 17 percent of the nation's electric supply in 1987. While no new nuclear plants have been ordered since 1978 in the United States, the federal government plans to bring about a nuclear resurgence in the mid-1990s.[49] Proponents of the plan argue that nuclear power will help reduce the need to burn coal and ease the threats of acid rain and the "greenhouse effect." But the tradeoff does not consider efficiency or renewable energy sources and poses an unnecessary exchange of air pollution for radioactive waste.

The success of the resurgence plan is dependent to a large degree on public acceptance of the safety of nuclear plant operation, resolution of questions on where to dispose of waste that will remain radioactive for longer than 10,000 years, and how to bring down the costs of building nuclear plants.

Nine compacts have been formed between states for cooperative efforts to site low-level radioactive waste dumps and are meeting with strong public resistance in many areas At least eight states have refused to join compacts. There has been also been strong resistance to the siting of a disposal sites for high level radioactive waste. Part of the problem is that states are being required to take title and liability for radioactive wastes that will be hazardous for thousands of years, without being given authority to regulate plants that generate the waste.

In the meantime, high-level wastes are being stored in "storage pools" at the plants. Pools at more than 40 plants will fill to their authorized capacity in the early 1990s. Proposals are expected for the expansion of pool size or authorized capacity and also for transport of high-level waste to temporary storage sites.

If all of the shipping is done by truck, it will require 6,405 shipments annually. If it is done by rail, it will require 830 shipments annually. Nearly every state is affected. The most heavily traveled roads for radioactive cargo are Interstate 80, which spans the country, and Interstate 95, the north-south route from Florida to Maine.

The policies of states along transport routes vary widely, with only 18 states requiring advance notification of the shipment. Most states along transport routes have only limited public response teams to respond to accidents. A few states, such as Idaho, South Carolina, Ohio and Missouri, that see frequent radioactive shipments have no public response teams and rely on federal authorities or private companies.[50]

In addition to radioactive

waste generated by the operation of nuclear plants, waste is also generated by uranium mining and processing. Several of the uranium mining and processing sites have seriously contaminated land and water and are on the federal Superfund list for toxic cleanup.

The federal government and taxpayers are picking up the tab for Superfund sites and major costs for nuclear waste disposal—expected to be more than $37 billion. By some federal estimates, this figure could easily double.

These topics offer only a brief sketch of the types of energy-related pollution generated in the usual course of operations. Studies need to be conducted to assess the full environmental costs of each source. But even without such studies, it is evident that energy efficiency is the cheapest method of reducing pollution costs and the rate of energy consumption. Beyond efficiency measures, renewable energy sources will offer increasingly attractive comparisons when full costs are accounted.

States have begun to discuss more energy efficiency and conservation. During the period from June 1986 to July 1987, 37 states undertook actions to explore or promote least-cost electrical planning. But only two states adopted progressive least-cost planning regulations and two states passed least-cost electrical planning statutes. Ten states are currently considered to have comprehensive least-cost provisions.

Also, in the wake of drastic federal reductions in support for renewable energy technologies and phase-out of tax credits, 8 of the 24 states that once offered renewable energy tax credits have let these provisions expire. Most notably, California which was once seen as the leader in progressive energy policy, failed to extend renewable energy tax credits at the end of 1987.

ENERGY AND POLLUTION SNAPSHOT

Energy-related pollution is generated by both consumption and production of energy supplies. Production profiles of states vary widely, depending on geographic location and resource base. But each state needs regulation of the damage resulting from energy production, regardless of source. In assessing the states, only the energy supplies used or produced were considered. A generic issue was the need for policies to control pollution from energy consumption and measures to encourage maximum efficiency in energy use.

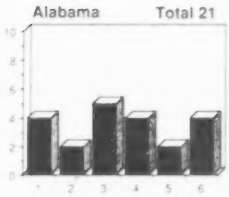
Massachusetts represents the best policies to control energy-related pollution. The state has moved steadily in the direction of energy efficiency by passing laws and regulations for conservation and least-cost electrical planning, appliance efficiency standards, and building code provisions. The state also reauthorized its renewable energy tax credits and is examining options for co-generation to produce both heat and electricity in state buildings.

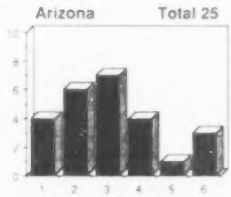
Although it has no oil or natural gas wells and no coal mining, the state does contain two operating nuclear plants as well as coal-fired power plants. It has not joined a compact for disposal of low-level radioactive waste, requires advance notification for transport of high-level radioactive waste, and has challenged the federal government's efforts to usurp state authority over emergency evacuation planning. The state has also developed acid rain research and acid rain control programs.

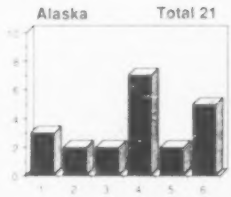
Currently:

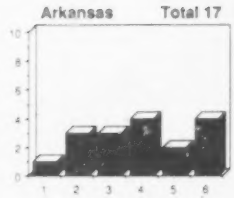
- 33 states contain a total of more than 100,000 oil and gas waste surface impoundments (pits and ponds);
- only one state has strict requirements for liners for surface impoundments;
- 16 states have no available data on the number of oil and natural gas waste surface impoundments within their borders;
- 16 states reclaimed less than half the land stripmined for coal during the period between 1978 and 1986;
- 29 states have initiated acid rain research, but only six have developed control programs;
- 32 state have a total of 107 nuclear plants in operation, and 17 require notification for transport of high-level radioactive waste;
- two states are challenging the federal government's effort to usurp state authority on evacuation planning for nuclear plant licensing;
- 10 states have adopted comprehensive least-cost electrical planning policies;
- 16 states offer renewable energy tax credits.

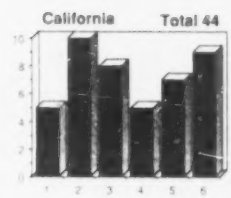
How The States Compare

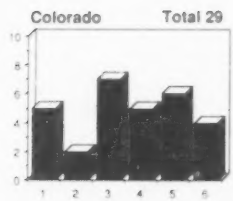


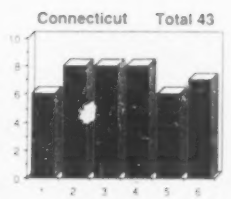


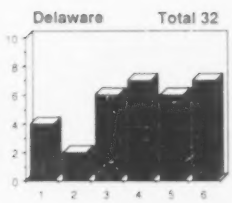


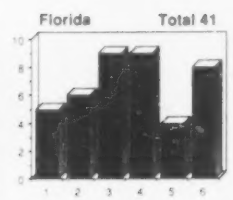


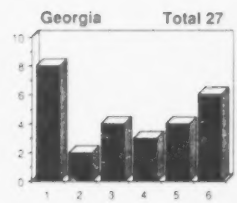


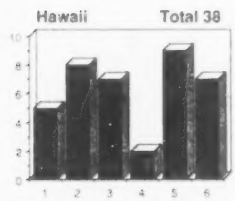


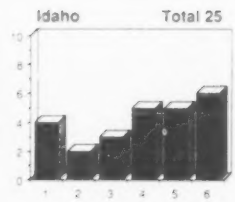


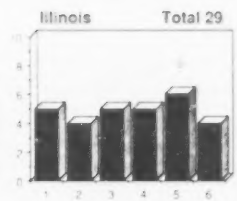


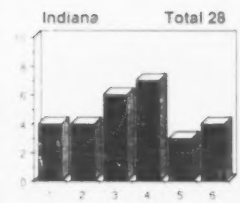


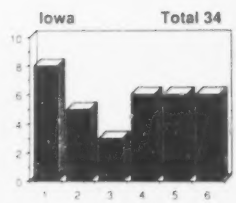


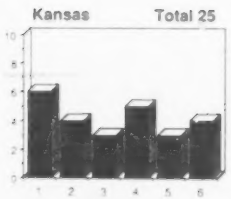


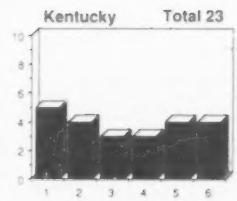


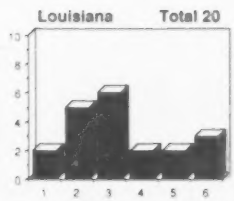


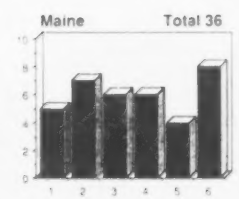


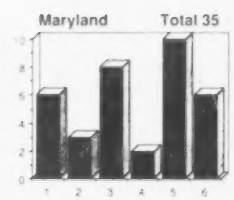


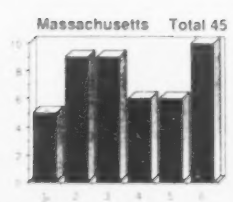


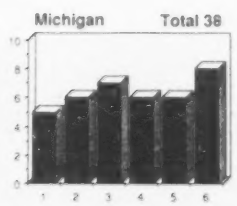


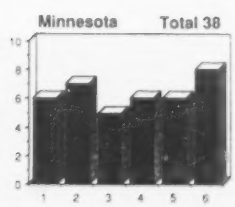


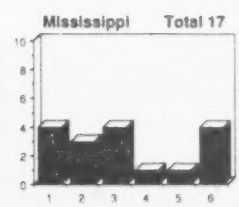


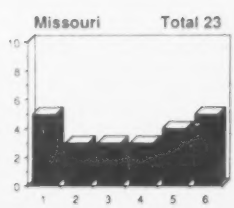




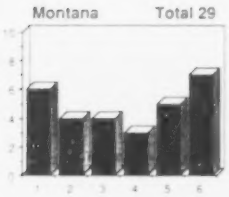


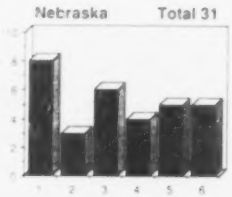


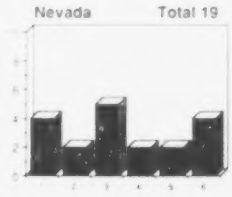


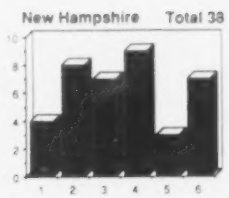


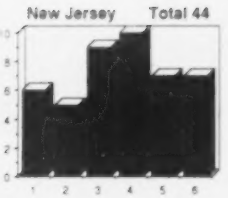
State Ranking Graphs

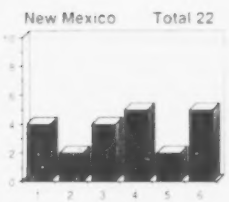


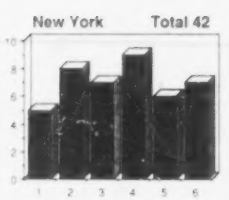


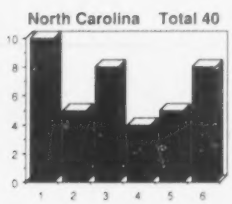


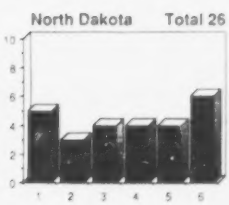


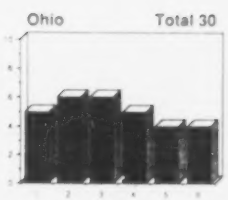


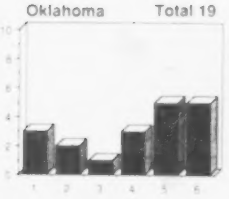


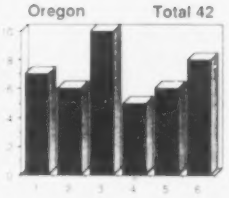


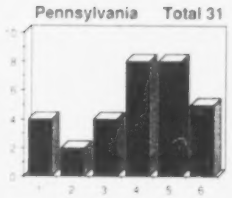


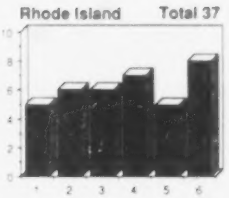


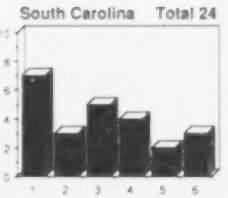


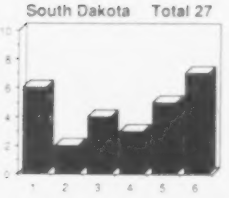


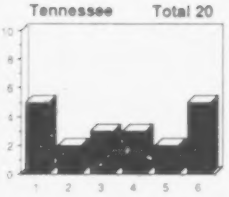


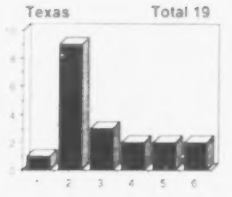


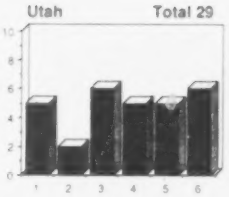


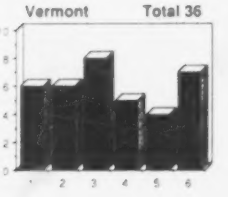


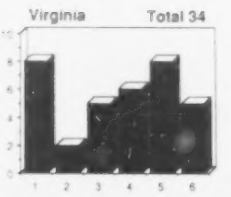


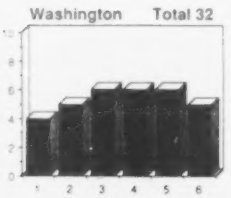


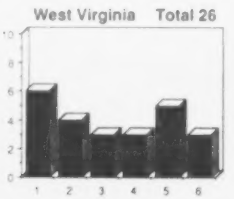


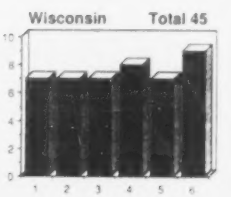


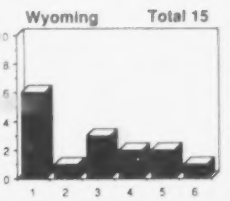












Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring, enforcement, and indications of progress. Although programs mandated by state legislatures, rather than innovative projects, are given greater weight, attention is given to assure that states have not simply "papered-over" a problem with new legislation.

The evaluation is both comparative and subjective and is not intended to represent an absolute scale in which the top state is doing everything possible to protect the environment on a given topic. For some topics, such as energy pollution control, recent progress is abysmal despite a few bright spots. And the overall comparison must also be taken within the general stall in momentum for environmental protection.

Research material and data the rankings are based on are drawn from a variety of sources: individual telephone and mail surveys of the states; information filed by the states with federal agencies; studies and surveys conducted by academic institutions, private contractors, and national environmental organizations; and information from peer reviewers.

In each case, we have utilized what we believe to be the best data available and noted the sources in the Matrix Keys. There are still shortcomings, however. One problem is the need to use data have a generic quality in which the same criteria has been applied to all states. At times the most recent data of this type are two or three years old. Another problem is that state-supplied information can have varying levels of accuracy. Where a state is obviously out of line, we have contacted state officials to verify or correct information. A more difficult problem is reluctance of government officials to supply data on enforcement, monitoring, or budgets—which leaves us with record of a program in place, but no measure of its scope or effectiveness. A final shortcoming is the absence of adequate data for all of the states on a given subtopic.

The key indicators used in the ranking are contained in the matrix pages, and several sub-matrices that will be published in a more detailed Focus Paper on each topic. Readers interested in more extensive information on a particular topic, or a state ranking on that topic, should request the appropriate Focus Paper (see inside back cover for ordering information).

Surface Water

The ranking of surface water protection programs assessed: state authority to oversee permit programs, regulation of federal facilities, pretreatment programs and construction grant management; the percent of major municipal and non-municipal dischargers in significant noncompliance; the number of enforcement actions undertaken by the federal Environmental Protection Agency because of failure in state action; the number and percentage of backlogged permits (up-to-date permits are essential to upgrade new standards and new criteria for monitoring); non-point source programs and policies; and the total river miles and lake acres assessed and the number meeting designated use.

State authority was seen as a fundamental measure of state commitment to surface water protection and integration with federal programs. The percent of major dischargers in non-compliance gave an indication of the effectiveness of the program (coupled with consideration of data on the extent of state monitoring and standards criteria). The percentage of backlogged permits also gave an indication of program effectiveness. The development of non-point source programs showed a state's ability to make new commitments to protect surface water. And the quality indication of assessed lakes and rivers provided a general sense of the extent of assessment that had taken place, and the quality of assessed water.

Pesticide Contamination

The primary indicators of state programs to reduce the dangers of pesticides that were considered in the rankings: drift restrictions, bans on pesticides, groundwater monitoring, state authority for testing pesticide residues on food, requirements for record-keeping by private applicators, and provisions for farmworker protection.

Drift restrictions cover a number of important subtopics, such as: whether financial responsibility or detailed insurance provisions are required; whether drift boundaries are specified in permits; whether advance notification or posting is required. Strong drift restrictions were given significant weight. Also given strong weight was the issuance of bans on pesticides. States lacking groundwater monitoring programs or authority to test for pesticide residues on food had points reduced. Four levels of farmworker protection were also assessed.

The amount of active ingredients used per state represents the best figures available. Biocontrol funding figures and integrated pest management figures are likewise the best figures currently available. They received no weight in the rankings, however.

Land-Use Planning

Ranking for land-use planning was based on a number of factors for managing growth and protecting key and critical areas. Primary consideration was given to four topics: the use of zoning regulations by cities and towns at four levels noted on the Matrix Key; the use of zoning and state regulation to protect critical areas such as wetlands, coastal areas, or wellheads; state provisions for siting of power plants and hazardous waste facilities; and special regional plans for forests or coastal zones. In addition, weight was given to states that have integrated their goals and planning through development of statewide land use plans. Also considered was state approval of the use of purchase of development rights to protect targeted lands. "Little NEPAs"—state versions of the National Environmental Policy Act—were noted in the matrix but not given weight in the rankings because of wide disagreement over what constitutes a state NEPA.

States without significant development pressure and few land use policies were generally in the middle of the scale, except if they lacked even the few applicable measures to protect land and resources. Also, it was considered desirable for all states to establish long term planning goals to protect key areas, resources, and quality of life.

Indoor Pollution

The primary indicators for indoor pollution policies and programs were: state no-smoking policies; the status and staffing of radon programs, as well as funding and testing available to residents; radon education programs; and data on the number of homes tested and the percentage found with excessive radon levels. Also considered were the numbers of children tested for lead poisoning and whether states have bans on the use of lead in drinking water systems in development or implemented. A final element was whether a state has ever implemented or utilized local or statewide household hazardous waste collection programs.

Each of the factors of smoking, radon, and lead was given equal weight in the ranking. The few states with little potential radon threats (according to geological maps produced by the Environmental Protection Agency) received no positive or negative weight for this topic. Household hazardous waste collection was considered as a final element to raise or reduce the basic points for each of the applicable topics.

Highway Safety

Highway safety ranking assessed: fatality rates; the number of accidents and policies regarding hazardous materials transport; seat belt laws and enforcement penalties; speed limits; requirements for motor vehicle inspections; the percentage of rural and urban interstate highway miles in poor condition; the percentage of bridges needing repair; drunk-driving laws; and integration of mass transportation policies; and spending per mile and per capita on mass transportation.

Examination of safety-oriented policies and road and bridge maintenance were measured against the fatality rate per 100 million vehicle miles traveled. Policies and spending on mass transportation (based on relative need) was a final consideration to raise or lower a state's ranking.

Energy Pollution

The ranking for this topic considered the impacts and policies of energy sources produced and consumed by each state. In addition to total energy consumption noted on the matrix, consumption of petroleum, natural gas, coal and electricity were examined individually and gauged against the development least-cost electric policies and support for renewable energy development. The primary emphasis, however, was on production-related pollution.

Consideration of the controls on production-related energy pollution was limited to: examinations of stripmining for coal, chiefly the acres of land disturbed and the acres reclaimed (indicated by release of reclamation bonds); research and control programs for acid rain pollutants; the number of surface impoundments and policies regarding liners for pits and ponds, as well as discharge of produced water and injection of wastes; and the number of nuclear plants in operation and under construction, the siting of radioactive waste dumps within the state, whether the state is a secondary or primary route for radioactive waste transport, and requirements for advance notification of radioactive waste transport and the existence of and number of public hazard response teams.

Energy sources not applicable to a stat, or produced in a lesser quantity were factored out of the assessment, and only those sources applicable were considered in the ranking.

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THE STATE OF THE STATES 1988

SURFACE WATER PROTECTION

1

FOCUS PAPER

RENEW AMERICA PROJECT

Prepared by:

Amy Sapowith and Scott Ridley
The Renew America Project
May 1988

The Renew America Project is a non-profit, tax-exempt educational organization dedicated to the efficient use of all natural resources. The Project provides individual citizens, state agencies and private organizations with information to assist grassroots change to ensure a clean, safe and livable environment for future generations. For further information on the Renew America Project or to obtain additional copies of this report contact: Renew America, 1001 Connecticut Avenue, N.W., Suite 719, Washington, D.C. 20036, (202) 466-6880. See page 34 for ordering information.

Introduction

The purpose of the Surface Water Protection paper, one of six focus papers designed to supplement the data in the 1988 State of the States report, is to provide more detailed information on the status of surface water programs and policies in the fifty states. It provides a national picture of protection efforts through maps, matrices, and explanation of key issues, and it allows comparison of the strength of state programs and policies. It is not intended to be a comprehensive assessment of surface water conditions in each state, but an accurate measure of key legislation and programs that states have put in place to protect surface water.

For information beyond the scope of this report, please see the contact list on page 33.

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FRESH SURFACE WATER CONSUMPTION & PROTECTION

Key to reading the map

Example: North Carolina - Best Overall

10 points for policies & programs

7,300 (M/gal) fresh surface water withdrawals per day

Withdrawals Source: National Water Summary 1985

Policies and Programs Source: The Fund for Renewable Energy and the Environment, 1988

Points for Policies & Programs

10-9	NC
8-7	GA, IA, NE, OR, SC, VA, WI
6-5	CA, CO, CT, FL, HI, IL, KS, KY, ME, MD, MA, MI, MN, MO, MT, NJ, NY, OH, ND, RI, SD, TN, UT, VT, WV, WY
4-3	AL, AK, AZ, DE, ID, IN, MS, NV, NH, NM, OK, PA, WA
2-1	AR, LA, TX

Surface Water Protection

On June 22, 1969, the Cuyahoga River in Cleveland went up in flames and burned two bridges. From a local perspective, it was a very unusual fire with flames five stories high blazing on the water. But in broader terms, the incident dramatized the pollution of surface water that cities have wrestled with through more than three decades of cleanup efforts.

Rivers, lakes, and streams have long been dumping grounds for everything from highly toxic chemicals to raw sewage. Progress has come for many rivers and lakes, but degradation has continued for others and new threats are ever-present. In Indiana and a number of other states, periodic warnings are issued to avoid eating fish caught in certain rivers. And the contamination of San Francisco Bay, Boston Harbor, Chesapeake Bay, the Great Lakes, and the Mississippi is expected to take decades to clean up.

More than just unusual fires and toxics-laden fish, surface water pollution has a far-reaching effect on our drinking water. On average, half of our drinking water comes from surface water sources. In some cases all of the drinking water for major cities, such as Washington, D.C., is dependent on surface water from rivers that also receive sewage and a host of chemicals from runoff. A few rivers, such as the Hudson, the Connecticut, and the Mississippi provide both cooling water for nuclear plants and drinking water supplies. While standard tests for bacteria are conducted frequently, testing of water supplies for radioactive contamination and a wide range of toxic chemicals is infrequent at best.

In late 1987, the Environmental Protection Agency estimated one-quarter of the nation's waterways still did not meet designated uses for recreation and drinking after 15 years of efforts. The agency has estimated that it will cost $110 billion to meet the nation's clean water goals by the year 2000.1

Efforts at reducing surface water contamination have essentially come full circle during the last 30 years. Although control over lakes and rivers was traditionally a local and state responsibility, growing concern over water pollution in the late 1940s and early 1950s brought federal action. In 1956, Congress passed the Federal Water Pollution Control Act, which established a federal-state partnership. Under the law, states were responsible for setting water quality standards and carrying out enforcement. The federal government provided funding, technical assistance, and backup enforcement for interstate waters.

By the mid-1960s, it became apparent that the 1956 law was inadequate. Many states had failed to establish effective water pollution control programs and actions against polluters were vulnerable to political pressure. The Water Quality Act, passed in 1965, required states to develop water quality standards for interstate waters and their tributaries and submit them to the federal government for approval by 1967.

By 1970, studies indicated a continuing decline in water quality. Dissatisfaction with enforcement procedures was also widespread. Growing national awareness of environmental problems and the first Earth Day celebration in 1970 helped to gather support for sweeping changes in federal water laws. The debate in Congress centered on the issue of whether the law should be based on effluent standards and technology favored by leaders of the House, or on ecological considerations to eliminate all effluents which the Senate favored. Eventually, the ecological concept became dominant.

In 1972, the Clean Water Act extended federal jurisdiction to all surface waters in the United States and gave the Environmental Protection Agency a stronger mandate in the states. The law set national goals to restore surface water to recreational status by July 1983 and to end all pollution discharges to rivers, lakes, and streams by 1985. It attacked "point source" pollution—such as factory discharge pipes, sewage treatment plants, and drainage ditches— by instituting a system of effluent limits and permits. But "non-point source" pollution— runoff of pesticides and fertilizer from farmland and a variety of pollutants from city streets and highways— remained unregulated. The program also left "toxic hot spots"—waters already contaminated with highly toxic chemicals—unregulated.

The Clean Water Act achieved limited success. According to the Environmental Protection Agency, from 1972 to 1982, 296,000 stream miles were maintained at the same quality, 47,000 stream miles were improved, and 11,000 miles degraded. But the 1983 deadline for restoring fishable, swimmable waters free of contaminants came and went as did the deadline to halt point source pollution by 1985.2

The commonly recognized shortcomings of the Clean Water program were: limited staff and budget to take on the ambitious goals, continued political pressure against enforcement, and the gaps in regulation of non-point source pollution and toxic hot spots. Reauthorization of the law revived the original debate. This time the concept of using economic and effluent standards dominated.

In 1987, after much debate and a presidential veto, Congress passed the Water Quality Act. Its advocates say it has a mix of effluent standard and ecological considerations. It clamps down on toxic water pollution by establishing tighter controls on persistent polluters and requires compliance by March 31, 1989. It also authorizes $400 million for a new state-federal program to control non-point source pollution. It strengthens provisions regarding estuaries, coastal waters, and lakes. But at bottom it allows certain degraded bodies of water to meet minimum standards only, and allows effluents below the minimum standards to be flushed into other rivers and lakes.

It also returns substantial responsibility to the states. And it sets up a 1994 phase-out of federal construction grants for wastewater treatment facilities by establishing an $8.4 billion state revolving loan fund for localities.

States are now in the process of formulating State Clean Water Strategies required by the Act. High on the list of concerns is how states can address the non-point source contamination that makes up about half of all water pollution. State non-point source assessments are due to EPA by August 1988 and should involve public participation and comment. The assessment will be part of a multi-year plan formulated to control polluted runoff from farms, streets, construction sites, and other non-point sources.

Many states are caught between development of new programs and the need to make existing programs more efficient. Wisconsin, for example, is considered to have the best non-point source pollution program. It was established in 1978 and addresses both urban and rural non-point source pollution. The Wisconsin Department of Natural Resources (DNR) and the state's Department of Agriculture Consumer Protection Program work cooperatively on the effort. The DNR and local governments develop technical assessments and implementation plans that identify critical areas within watersheds and farmland. The state shares with landowners and municipalities the cost for installation of approved methods of controlling the identified pollution. Projects follow an eight-to-nine year planning and implementation cycle and the state has targeted 130 priority watersheds for work over a period of 25 years.3

Wisconsin still has problems with traditional point source pollution programs, however. The National Wildlife Federation and other environmental organizations have charged that the state DNR has refused to implement Wisconsin's anti-degradation rule that would protect rivers and lakes that have water quality above minimum standards. The state is also said to have neglected issuance of permits to control toxic pollution discharges. EPA has vetoed 17 major Wisconsin permits that did not comply with federal law and the environmentalists' case against the state is still pending a year later.

Timely renewal and approval of permits is important in keeping both standards for effluent and technology up to date. Six states have no federal approval to oversee National Pollution Discharge Elimination System (NPDES) permits, regulation of federal facilities, pretreatment programs, or construction grant management: Alaska, Arizona, Florida, Idaho, Maine, and Massachusetts. Louisiana, New Hampshire, New Mexico, Oklahoma, South Dakota, and Texas have authority over construction grants only. And Nevada, Rhode Island, Vermont, and Wisconsin—states with substantial authority—have permit backlogs higher than any other state in the country. This problem is especially critical when there are a significant number of dischargers in non-compliance, or a high percent of rivers or lakes that do not meet designated use standards.4

Arkansas, Delaware, Nevada, and New Hampshire have the highest percentage of major non-municipal dischargers in significant non-compliance. And Arkansas, Idaho, Indiana, Louisiana, Maryland, Minnesota, Ohio, and Washington have more than one-fifth of the major municipal public treatment works in significant non-compliance. In many cases the Environmental Protection Agency must step in and provide backup to states unable to resolve chronic water pollution problems.

In 1986, EPA undertook 100 actions in Arkansas, 61 actions in Florida, 79 actions in Kentucky, 99 actions in Louisiana, 58 actions in Oklahoma, and 172 actions in Texas. Nine states saw no EPA actions. And 22 states saw fewer than 10 actions. Water quality assessment of rivers and lakes can vary widely from state to state. States differ not only on methods of data collection, but in the water standards they set and the kind of monitoring required. All states have general narrative requirements that all waters must be free from toxic substances in toxic amounts. But they differ on numeric criteria in defining toxic amounts. Thirty states have numeric criteria for non-organic pollutants with Colorado, New York, and West Virginia having the most. Thirty-one states have numeric standards for organic pollutants,

again with New York and Colorado in the lead.[5]

Also important are bioassays—testing of organisms in the water to measure accumulation of toxic chemicals. In 1986, EPA found that 37 states require industries to conduct bioassays and 27 states require municipalities to conduct bioassays. However, the amount of testing in most states is very limited. Nationwide, only 38 percent of major industrial dischargers with permits were tested and only 11 percent of major municipal dischargers. California, Florida, New Jersey, Louisiana, and North Carolina are among the states with the most compehensive testing programs.

An upcoming challenge for both existing and new water protection programs in the states will be how to fund monitoring and enforcement activities as well as new treatment facilities. A few states are putting a greater emphasis on enforcement and fines against polluters. Massachusetts has passed a law allowing stiff fines for polluters. In the first six months, $697,000 in penalties were assessed.[6] State officials say the fines do two things: send a message to polluters that they will bear the economic consequences of cleanup—and force the polluters who don't comply to help cover the cost of the state monitoring and regulatory efforts. Another useful disincentive might be taxes placed on industries that regularly dump waste containing heavy metals into public sewage systems. On average, industries are responsible for 80 percent of heavy metals in public sewage systems. States might also assess higher fees for discharge permits.

Shifting greater financial responsibility to polluters may help resolve the primary issue of how to pay the $110 billion needed for surface water cleanup. It could also encourage waste minimization on-site and support new federal proposals for solutions to start at the source of pollution. Researchers at the federal Office of Technology Assessment have found that more than 99 percent of all government spending is for "end-of-the-pipe" pollution control. What they propose is utilizing our technological capabilities for waste minimization at the source—recycling, waste treatment, and waste reduction.[7]

Protecting the quality of surface water in each state is an on-going task at the heart of public health, wildlife, and quality-of life issues. Much will depend on formulation and implementation of state strategy plans, and on-going shifts in philosophy on ecological or effluent standard- based policies—as well as interrelated policies on land-use, pesticides, and energy-related pollution—all of which contribute to protecting water quality and public health.

Surface Water Main Matrix

	1	2	3	4	5	6	7	8	9	10
Alabama	1, 2, 3	111	6%	86	19%	1	11/9%	2	40600/30/90	505336/100/100
Alaska	0	310	3%	19	16%	63	–	1	365,000/1/53	12787200/2/53
Arizona	0	18	0	18	0	18	–	2	17,537/8/44	110770/31/86
Arkansas	1, 2, 3, 4	54	20%	58	33%	100	5/11%	2	11438/100/52	
California	1, 2	90	3%	155	8%	61	9/12%	3	26959/36/64	1397137/92/48
Colorado	1, 4	44	14%	63	4%	10	0/28%	2		
Connecticut	1, 3, 4	97	16%	67	10%	0	21/9%	5	8400/10/68	82900/45/95
Delaware	1	23	22%	14	7%	7	7/9%	4	579/89/60	
Florida	0	164	2%	110	20%	61	–	4	9320/71/68	920320/87/62
Georgia	1, 2, 3, 4	57	2%	103	8%	0	1/2%	4	20000/85/95	417730/100/87
Hawaii	1, 2, 3	15	0	11	9%	2	36/5%	3		
Idaho	0	36	19%	28	25%	9	–	4	7310/100/83	362718/100/100
Illinois	1, 2	103	13%	177	10%	8	8/1%	4	14080/24/55	242359/10/7
Indiana	1, 2	86	8%	101	28%	7	16/9%	2		92800/94/97
Iowa	1, 2, 3, 4	31	10%	63	2%	0	10/6%	4	18000/24/2	81200/91/73
Kansas	1, 2, 4	14	14%	42	2%	0	0/19%	4	20600/22/78	168164/94/66
Kentucky	1, 2, 3	212	2%	55	7%	79	11/3%	3	40000/14/55	376305/96/90
Louisiana	4	151	2%	74	31%	99	–	2	14180/18/50	514212/91/87
Maine	0	29	13%	63	10%	8	–	3	31672/100/97	994560/100/96
Maryland	1, 3	52	10%	36	28%	6	4/14%	5	9300/80/92	32583/100/76
Massachusetts	0	83	13%	102	13%	17	–	3	10704/16/48	150341/31/--
Michigan	1, 2, 3	118	8%	98	16%	11	19/11%	3	36350/100/98	
Minnesota	1, 2, 3	27	4%	50	24%	0	12/4%	4		
Mississippi	1, 2, 3	40	0	44	2%	–	0/25%	2	10274/100/90	500000/99/96
Missouri	1, 2, 3, 4	50	6%	82	11%	7	19/10%	3	20536/100/51	
Montana	1, 2, 4	19	16%	26	0	0	8/5%	4	20532/95/62	756450/88/95
Nebraska	1, 2, 3, 4	27	4%	43	12%	1	5/0	3	24000/20/57	198100/53/97
Nevada	1, 2, 3, 4	3	33%	10	0	–	25/67%	2		
New Hampshire	4	29	24%	40	5%	4	–	3	14544/9/74	
New Jersey	1, 2, 3	164	15%	155	16%	6	14/16%	4	6450/12/29	18923/100/72
New Mexico	4	14	14%	21	14%	9	–	2	3500/100/90	5725/100/92
New York	1, 2, 4	154	11%	236	6%	7	7/15%	3	70000/5/78	739000/39/80
North Carolina	1, 2, 3	90	1%	122	11%	4	12/9%	4	37359/100/67	320506/100/97
North Dakota	1, 4	7	0	16	0	1	0/0	2		
Ohio	1, 2, 3	137	13%	155	26%	15	11/17%	4	43900/15/61	
Oklahoma	4	32	9%	56	7%	58	–	3		
Oregon	1, 2, 3	24	0	35	9%	–	11/8%	4	90000/13/82	500000/38/59
Pennsylvania	1, 2	167	16%	235	12%	34	4/5%	4	50000/12/54	
Rhode Island	1, 2, 3	14	7%	20	20%	0	20/27%	3	724/100/90	16520/100/97
South Carolina	1, 2, 3	101	0	83	10%	0	7/3%	2	9679/25/87	455000/89/99
South Dakota	4	4	0	26	12%	6	–	4	9937/40/47	1598285/41/87
Tennessee	1, 3	56	4%	84	5%	–	0/4%	2	19124/30/66	538603/100/80
Texas	4	226	6%	249	17%	172	–	1	80000/20/94	
Utah	1, 2, 3, 4	18	6%	37	19%	7	–	4		
Vermont	1, 3, 4	7	0	30	7%	–	21/40%	4	4863/24/76	224066/100/94
Virginia	1, 2	66	2%	66	3%	2	0/1%	5	27240/17/20	129622/100/91
Washington	1, 3	43	16%	45	24%	1	23/11%	3		
West Virginia	1, 2, 3, 4	71	15%	34	18%	1	0/24%	2	22819/80/56	16158/100/89
Wisconsin	1, 2, 3	60	7%	87	3%	0	22/71%	5		971000/100/21
Wyoming	1, 2	24	4%	17	6%	2	20/0	4	19655/100/88	411284/70/82

MATRIX KEY

1. EPA Approved State Programs: "1"— approval of National Pollutant Discharge Elimination System permit program; "2"—approval of state regulation of federal facilities; "3"—approval of pretreatment program; "4"—state authority over construction grant program, "o"—no provision.

2. Major Non-Municipal Dischargers: number of major non-municipal facilities permitted to discharge into surface waters.

3. Percent in Significant Non-Compliance: percentage of above total violating established water quality standards specified on permit.

4. Major Municipal Dischargers: number of major municipal facilities permitted to discharged into surface waters.

5. Percent in Significant Non-Compliance: percentage of above total violating established water quality standards specified on permit.

6. EPA Enforcement Actions: number of actions undertaken by EPA to back up failure of state agencies.

7. Permit Backlog: number and percentage of total permits needing to be processed.

8. Non-Point Source Programs and Policies: scale of 1-5 for scope of state programs to control pollution from agricultural, urban, construction runoff, and other non-point sources; "5" indicates most comprehensive.

9. Total River Miles/Percent Assessed/Percent Meeting Designated Use: figures supplied by states to EPA for 1986.

10. Total Lake Acres/Percent Assessed/Percent Meeting Designated Use: figures suppled by states to EPA for 1986.

The Final Scores

	Surface Water Points	Total Points	Overall Ranking
Massachusetts	5	45	1
Wisconsin	7	45	
California	5	44	3
New Jersey	6	44	
Connecticut	6	43	5
New York	5	42	6
Oregon	7	42	
Florida	5	41	8
North Carolina	*10	40	9
Hawaii	5	38	10
Michigan	5	38	
Minnesota	6	38	
New Hampshire	4	38	
Rhode Island	5	37	14
Maine	5	36	
Vermont	6	36	
Maryland	6	35	17
Iowa	8	34	18
Virginia	8	34	
Delaware	4	32	20
Washington	4	32	
Nebraska	8	31	22
Pennsylvania	4	31	
Ohio	5	30	24
Colorado	5	29	25
Illinois	5	29	
Montana	6	29	
Utah	5	29	
Indiana	4	28	29
Georgia	8	27	30
South Dakota	6	27	
North Dakota	5	26	32
West Virginia	6	26	
Arizona	4	25	34
Idaho	4	25	
Kansas	6	25	
South Carolina	7	24	37
Kentucky	5	23	38
Missouri	5	23	
New Mexico	4	22	40
Alabama	4	21	41
Alaska	3	21	
Louisiana	2	20	43
Tennessee	5	20	
Nevada	4	19	45
Oklahoma	3	19	
Texas	1	19	
Arkansas	1	17	48
Mississippi	4	17	
Wyoming	6	15	50

Key:

Surface Water Protection Points are based on a scale of 1 to 10. The points were derived from the data in the matrices and measure the strength of state programs and policies to protect the environment. See "Ranking Notes" on page 9 for a detailed explanation.

Total Points consist of a maximum score of 60 points. Each of the six topics in the 1988 main report have a maximum value of 10 points. (The six topics are: Indoor Pollution, Surface Water Protection, Reducing Pesticide Contamination, Land Use Planning, Highway Safety, and Energy Pollution Control). The point values for each topic are added together to give the state's total point score.

Overall Ranking is the ranking of the states based on the total points received for all six topics. In the case of a tie each state is given the same ranking. Example: Both Massachusetts and Wisconsin received 45 points and tied for first place.

Summary Example: With 32 points, Washington ranks 20th in the nation for the strength of state environmental programs examined. For surface water protection, Washington received 4 points on a 10 point scale. The 4 points received for surface water were added together with the points received for the remaining five topics to equal the total point score of 32.

* **North Carolina** was judged to have the strongest programs and policies for surface water protection and received 10 points (see Indoor Pollution Snapshot).

Surface Water Snapshot

North Carolina represents the best overall state programs and policies to protect surface water. Sixty-seven percent of the 37,359 miles of rivers and streams in the state support designated use. And 97 percent of the 320,506 acres of lakes and reservoirs support designated use. It is estimated that non-point sources, especially agricultural and urban runoff, account for 71 percent of the degraded stream mileage. As much as one third of total lake acreage is threatened with degradation. Extensive control efforts are reported to be underway.

For non-point source control efforts, the state has begun to reduce erosion and sedimentation from abandoned mines and has developed a cost-sharing program with farmers to implement measures to reduce erosion and contamination from animal wastes.

Of 90 major non-municipal dischargers monitored in the last half of 1986, only one percent were in significant non-compliance. Of the major municipal dischargers, 11 percent were in significant non-compliance. Thirty of the major industrial dischargers are required to undergo bioassay testing. Only 24 of the major municipal dischargers undergo bioassays.

The state maintains a network of 350 ambient water monitoring stations and has numeric criteria for 15 non-organic pollutants and 16 organic pollutants.

North Carolina withdraws 7.3 billion gallons of surface water per day. About forty-five percent of the state's population has its needs met by surface waters. Similar to other states, North Carolina faces a difficult challenge in maintaining the quality of its surface waters, and in cleaning up problem areas. In this task, it needs full cooperation from federal agencies.

Currently:

- only 12 states lack federal approval for issuing permits under the National Pollutant Discharge Elimination System;
- 20 states lack federal approval for the state to regulate federal facilities;
- 24 states lack federal approval for pretreatment programs;
- four states have made significant progress in developing programs to reduce non-point source pollution;
- 10 states have a permit backlog of less than five percent.

Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring, enforcement, and indications of progress. Although programs mandated by state legislatures rather than innovative projects, are given greater weight, attention is given to assure that states have not simply "papered-over" a problem with new legislation.

The evaluation is both comparative and subjective and is not intended to represent an absolute scale in which the top state is doing everything possible to protect the environment on a given topic. Research material and data the rankings are based on are drawn from a variety of sources: individual telephone and mail surveys of the states; information filed by the states with federal agencies; studies and surveys conducted by academic institutions, private contractors, and national environmental organizations; and information from peer reviewers. In each case, we have utilized what we believe to be the best data available.

The ranking of surface water protection programs assessed: state authority to oversee permit programs, regulation of federal facilities, pretreatment programs and construction grant management; the percent of major municipal and non-municipal dischargers in significant non-compliance; the number of enforcement actions undertaken by the federal Environmental Protection Agency because of failure in state action; the number and percentage of backlogged permits (up-to-date permits are essential to upgrade new standards and new criteria for monitoring); non-point source programs and policies; and the total river miles and lake acres assessed and the number meeting designated use.

State authority was seen as a fundamental measure of state commitment to surface water protection and integration with federal programs. The percent of major dischargers in non-compliance gave an indication of the effectiveness of the program (coupled with consideration of data on the extent of state monitoring and standards criteria). The percentage of backlogged permits also gave an indication of program effectiveness. The development of non-point source programs showed a state's ability to make new commitments to protect surface water. And the quality indication of assessed lakes and rivers provided a general sense of the extent of assessment that had taken place, and the quality of assessed water.

State Inspections Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13
Alabama	10		131		19		4	107	1	2	1	1	276
Alaska	1		1										2
Arizona			17					2					19
Arkansas	4	3	72	1				9		3		3	95
California			78		16			120			5		219
Colorado			52				10	156					218
Connecticut			115		58			222					395
Delaware							32	73					105
Florida	1	5	22					50					78
Georgia	29		78		9		17	140		17	21	22	333
Hawaii			16					20					36
Idaho			4					14					18
Illinois	7	12	26		8		1526	135	9	3	18	3	1747
Indiana			76	3	12	2	114	49		38			294
Iowa			37		3			34			4		78
Kansas			20		2			3			1		26
Kentucky			289		20		123	46	1	3	26	2	510
Louisiana			53				32	34					119
Maine	5		170				4	20			2		201
Maryland	34		195		44			69		7			349
Massachusetts			199		4		25	41					269
Michigan		16	62	9		2	187	39	13	15	50	1	397
Minnesota			39				9	3		4	2		57
Mississippi			16		47		15	29					107
Missouri			23		8		22	31		7	17	1	109
Montana				2			4	31					37
Nebraska	1		66				19	6					92
Nevada			1					1					2
New Hampshire		8	171					24			3		206
New Jersey			289		20	1		12		11			333
New Mexico			3				15	5					23
New York			294				722	57			15		1100
North Carolina	3	49	152	5	1		6	101	2	2	35	1	387
North Dakota			17		3			28					48
Ohio		1	156		67		7	51		16	63	8	369
Oklahoma			14					12					26
Oregon	2		47					9					58
Pennsylvania	2	1	741				204	135			2	1	1086
Rhode Island			1					29		2	1	2	35
South Carolina	12	28	78		1		352	243		18	17	17	766
South Dakota			17				6	8					31
Tennessee	7	8	80		6	4	105	45		10	47		312
Texas			69					198					267
Utah			21				2	33					56
Vermont			30		3		19	13					65
Virginia	13		38					35					86
Washington			46	1			1	37					85
West Virginia	5	26	23		4	1		48		4			111
Wisconsin	9		60				6	21		1	12		109
Wyoming			10					59					69

State Inspections Matrix Notes

Column 1. Performance Audit Inspection (PAI): PAI's focus on quality assurance of the permittee's self-monitoring program by evaluating permittee performance; may include sample collection, flow measurement , lab analyses, and reporting.

Column 2. Compliance Biomonitoring: Compliance Biomonitoring includes analyzing effluent samples for toxic pollutants, reviewing permittee records and reporting systems.

Column 3. Compliance Evaluation Inspection (CEI): CEI's are based on record reviews and walk-through surveys of a facility. Influent and effluent are usually observed. The inspection averages 2-3 days. No water samples are taken.

Column 4. Diagnostic: These inspections focus on Construction Grant facilities (municipal wastewater treatment plants) and basically address noncompliance problems.

Column 5. Industrial User Inspection: Industrial User Inspections are inspections of the industrial indirect discharger conducted by the control authority for the pretreatment program (usually the POTW but in some cases the state or EPA) to insure that treatment processes are functioning properly, adequate records are being kept, no changes in production rates have taken place, and stored chemicals are properly controlled.

Column 6. Enforcement Case Support: the number of actions the state has taken in an effort to document a violation.

Column 7. Reconnaissance Inspection (RI's): RI's represent a quick look at a discharger's effluent when reports and other indications of permit compliance are positive.

Column 8. Compliance Sampling Inspection (CSI): In a CSI, a representative sample(s) of a permittee's effluent is collected and chemically analyzed. The results are used to verify the accuracy of the permittee's self-monitoring program and reports, to gather evidence for enforcement proceedings, or to determine the quantity and quality of effluents .

Column 9. Toxics Inspection: Toxics inspections check for compliance with particular chemical limits set out in the discharge permit. Includes effluent sampling.

Column 10. Pretreatment Audit: Pretreatment audits are used to monitor how the control authority assesses compliance and initiates and carries out enforcement activities. POTWs' policies and procedures, staffing levels, and recordkeeping are evaluated.

Column 11. Pretreatment Compliance Inspection (PCI): PCI's are similar to but not as extensive as the pretreatment audit.

Column 12. Industrial User Inspection with Pretreatment Audit: This inspection focuses on the POTW's procedures in regulating the industrial user discharging into the treatment plant.

Column 13. Total Inspections: Total number of inspections conducted by the state.

Source: US EPA, Office of Water, Compliance Evaluation Section, Washington, D.C., July 1986-June 1987.

Non Point Source Matrix

	1	2	3	4	5
Alabama	W	L	L	L	L
Alaska	N	W	W	L	N
Arizona	L	L	L	L	L
Arkansas	W	L	L	N	L
California	W	L	L	L	L
Colorado	L	L	L	L	L
Connecticut	L	N	N	W	W
Delaware	W	N	N	L	L
Florida	W	L	L	L	W
Georgia	W	L	L	L	L
Hawaii	L	N	N	L	L
Idaho	W	W	L	L	L
Illinois	W	L	L	L	L
Indiana	W	L	L	L	L
Iowa	W	N	L	L	L
Kansas	W	N	L	L	L
Kentucky	W	L	L	L	L
Louisiana	W	L	L	L	L
Maine	W	W	L	L	L
Maryland	W	L	L	L	L
Massachusetts	L	L	N	L	L
Michigan	W	L	L	L	L
Minnesota	W	L	L	L	L
Mississippi	L	L	L	L	L
Missouri	L	N	L	N	L
Montana	W	L	L	L	L
Nebraska	W	N	N	N	L
Nevada	L	L	L	L	L
New Hampshire	L	L	N	L	L
New Jersey	L	L	L	L	W
New Mexico	W	L	L	L	L
New York	L	L	L	L	L
North Carolina	W	W	L	L	L
North Dakota	W	N	N	L	L
Ohio	W	L	L	L	L
Oklahoma	L	L	L	L	L
Oregon	W	W	L	L	L
Pennsylvania	W	L	W	L	L
Rhode Island	L	N	L	W	L
South Carolina	W	L	L	L	L
South Dakota	W	L	L	L	L
Tennessee	W	L	L	L	L
Texas					
Utah	W	L	L	L	L
Vermont	W	W	L	L	L
Virginia	W	L	L	W	W
Washington	W	W	L	L	L
West Virginia	W	L	W	W	L
Wisconsin	W	L	L	L	L
Wyoming	W	L	L	L	L

Non Point Source Matrix Notes

Abbreviations

W - identified as a widespread problem (50% or more of the state's waters are affected)

L - identified as a localized problem (less than 50% of the state's waters are affected)

N - source does not occur in state or does not affect support of designated uses

Column 1. Agricultural Nonpoint Source Pollution: the agricultural nonpoint source problem is directly related to the way in which the land is used and is caused by several different sources. These include nonirrigated croplands, both row (e.g. corn and soybeans) and field (e.g. wheat); irrigated croplands; animal production on rangeland and pastureland; and livestock facilities.

Column 2. Silvicultural Nonpoint Source Pollution: the silvicultural nonpoint source problem is directly related to forest management activities. These activities include road building, pesticide and herbicide application, harvesting and logging operations, removal of trees from the harvesting site, and the preparation of the site for revegetation.

Column 3. Mining Nonpoint Source Pollution: the mining nonpoint source problem is not a homogeneous one and depends on the minerals mined. Coal and metal mining are the sources discussed here. The principal nonpoint source problems include runoff of sediment from haul roads at both active and inactive mine sites; drainage of pollutants including acid, sediment, salts, and metals from inactive mines; and drainage and leachate containing acid, metals, and sediment from the spoil and tailings piles generated both by active and inactive mines.

Column 4. Construction Nonpoint Source Pollution: nonpoint source pollution caused by construction activities can have severe localized impacts on water quality from high erosion rates. While sediment is the main construction site pollutant, other pollutants such as chemicals from fertilizer, pesticides, petroleum products, construction chemicals, and solid wastes are also generated.

Column 5. Urban Nonpoint Source Pollution: urban runoff from rainwater running off roofs, lawns, streets, industrial sites, and other pervious and impervious areas washes a number of important constituents into urban lakes and streams. These constituents include sediment and debris from decaying pavements and buildings; heavy metals and inorganic chemicals arising from transportation activities and building materials; nutrients from fertilizers; petroleum products from spills and leaks; and fecal bacteria from animal wastes and ineffective septic tanks.

Sources: America's Clean Water: The State's Evaluation of Progress: 1972-1982 Appendix, Association of State and Interstate Water Pollution Control Administrators, Washington, D.C., 1984 and updated by EPA regions and States, 1985.

Report to Congress: Nonpoint Source Pollution in the U.S., U.S. EPA, Office of Water, Washington, D.C., January 1984.

Agricultural Pollution Matrix

	1	2	3	4	5	6
Alabama			P			P
Alaska						
Arizona	P	P	P		P	
Arkansas	P		P		P	P
California	P	P	P	P	P	
Colorado	P	P	P			
Connecticut			P			P
Delaware		P		P		
Florida		P	P		P	
Georgia			P		P	
Hawaii			P		P	
Idaho		P	P		P	
Illinois			P	P	P	
Indiana			P	P		
Iowa		P	P	P	P	P
Kansas		P	P	P	P	
Kentucky			P	P	P	
Louisiana			P	P	P	
Maine		P			P	P
Maryland		P	P	P		P
Massachusetts			P			
Michigan		P	P			P
Minnesota			P			P
Mississippi			P		P	
Missouri			P			
Montana	P	P	P			
Nebraska	P	P	P	P	P	
Nevada	P	P	P			P
New Hampshire			P			P
New Jersey		P	P	P		P
New Mexico		P	P			
New York		P	P	P	P	P
North Carolina		P	P	P	P	
North Dakota		P	P			
Ohio		P	P			
Oklahoma			P	P	P	
Oregon		P	P			P
Pennsylvania			P			P
Rhode Island			P			
South Carolina			P			P
South Dakota			P		P	P
Tennessee			P		P	P
Texas	P	P	P		P	
Utah	P	P	P			
Vermont		P	P	P		P
Virginia		P			P	
Washington			P			
West Virginia		P	P			P
Wisconsin		P	P			
Wyoming	P	P	P			

Agricultural Pollution Matrix Notes

Column 1. Salinity

Column 2. Nutrients

Column 3. Erosion/Sedimentation

Column 4. Fertilizers

Column 5. Pesticides

Column 6. Small Feedlots/Animal Waste

* High priority problems are denoted by "P". Blank spaces do not necessarily indicate the absence of a particular problem in a state; instead, they reflect either a lack of information for that state, or that the pollutant was not considered to be a priority problem.

Sources: Report to Congress: Nonpoint Source Pollution in the U.S., U.S. EPA, 1984, p. 2-10.

Implementation Status of State 208 Agricultural Programs, Draft, EPA, Water Planning Division, September 1980, Appendix A.

RCA Potential Problem Area II Water Quality: Problem Statement and Objective Determination, USDA, July 1979, pp. 65-67.

Unpublished information from EPA Regional personnel.

Toxic Pollutant Numeric Criteria Matrix

	1	2	3	4
Alabama				
Alaska	1	2	3	3
Arizona	13	1	14	3
Arkansas		6	6	
California	11	12	23	5
Colorado	22	18	40	16
Connecticut				
Delaware		1	1	
Florida	15	19	34	10
Georgia	5	5	10	2
Hawaii				
Idaho	2		2	2
Illinois	16	1	17	7
Indiana				
Iowa	12	1	13	4
Kansas	1		1	1
Kentucky	11	4	15	5
Louisiana		8	8	
Maine	1		1	
Maryland	1	7	8	1
Massachusetts				
Michigan				
Minnesota	6	1	7	3
Mississippi		1	1	
Missouri	1		1	1
Montana				
Nebraska	16	4	20	5
Nevada	10	18	28	8
New Hampshire		1	1	
New Jersey	2	7	9	2
New Mexico	2		2	2
New York	21	27	48	22
North Carolina	15	16	31	10
North Dakota	14	2	16	6
Ohio	16	2	18	4
Oklahoma		11	11	
Oregon	12	1	13	6
Pennsylvania	9	1	10	5
Rhode Island				
South Carolina				
South Dakota	4	1	5	3
Tennessee				
Texas				
Utah	11	5	16	5
Vermont				
Virginia	15	19	34	12
Washington				
West Virginia	21	9	30	12
Wisconsin				
Wyoming	2	1	3	2

Toxic Pollutant Numeric Criteria Matrix Notes*

Column 1. Non-organic Priority Pollutant Criteria**: number of non-organic priority pollutants for which the state has numeric criteria.

Column 2. Organic Priority Pollutant Criteria: number of organic priority pollutants for which the state has numeric criteria.

Column 3. Total Priority Pollutant Criteria: total number of priority pollutants for which the state has numeric criteria.

Column 4. Total Non-priority Pollutant Criteria*: total number of non-priority pollutants for which the state has numeric criteria.

* Freshwater aquatic life designations only

** Priority pollutants are those126 specific toxic pollutants, for which EPA has issued numeric criteria guidelines.

*** Non-priority pollutants are those toxic pollutants for which EPA has not issued numeric criteria guidelines.

Source: Numeric Criteria for Toxic Pollutants in State Water Quality Standards, US EPA, Office of Water Regulations & Standards, April 28, 1986.

Permit Backlog Matrix

	1	2	3	4	5	6
Alabama	87	10	11	117	11	9
Alaska						
Arizona						
Arkansas	58	3	5	56	6	11
California	152	14	9	98	12	12
Colorado	68	0	0	53	15	28
Connecticut	67	14	21	97	9	9
Delaware	14	1	7	22	2	9
Florida						
Georgia	97	1	1	60	1	2
Hawaii	11	4	36	19	1	5
Idaho						
Illinois	176	14	8	106	1	1
Indiana	100	16	16	91	8	9
Iowa	53	8	10	32	2	6
Kansas	40	0	0	16	3	19
Kentucky	54	6	11	208	7	3
Louisiana						
Maine						
Maryland	35	5	14	56	8	14
Massachusetts						
Michigan	95	18	19	115	13	11
Minnesota	49	6	12	26	1	4
Mississippi	42	0	0	40	10	25
Missouri	80	15	19	52	5	10
Montana	26	2	8	19	1	5
Nebraska	42	2	5	27	0	0
Nevada	8	2	25	3	2	67
New Hampshire						
New Jersey	154	21	14	163	26	16
New Mexico						
New York	236	17	7	154	23	15
North Carolina	121	14	12	95	9	9
North Dakota	16	0	0	9	0	0
Ohio	149	16	11	139	23	17
Oklahoma						
Oregon	35	4	11	25	2	8
Pennsylvania	235	10	4	169	9	5
Rhode Island	20	4	20	15	4	27
South Carolina	83	6	7	103	3	3
South Dakota						
Tennessee	85	0	0	71	3	4
Texas						
Utah						
Vermont	29	6	21	10	4	40
Virginia	63	0	0	70	1	1
Washington	43	10	23	47	5	11
West Virginia	34	0	0	70	17	24
Wisconsin	86	19	22	58	41	71
Wyoming	17	0	0	20	0	0

Permit Backlog Matrix

Column 1. Major Municipal Dischargers: number of major municipal facilities discharging into surface waters.

Column 2. Permits Expired: number of major municipal facilities whose permits to discharge into surface waters have expired.

Column 3. Percent Expired: percentage of major municipal dischargers with expired permits.

Column 4. Major Non-Municipal Dischargers: number of non-municipal facilities discharging into surface waters.

Column 5. Permits Expired: number of non-municipal facilities whose permits to discharge into surface waters have expired.

Column 6. Percent Expired: percentage of major non-municipal dischargers with expired permits.

Source: Permit Compliance System, Office of Water Enforcement and Permits, US EPA, Washington, DC, June 1987.

EPA Enforcement Matrix

	1	2	3	4
Alaska			1	0
Alabama	15	3	63	1
Arizona	5	1	18	5
Arkansas	4	2	100	45
California	17	9	61	2
Colorado	16	9	10	1
Connecticut	7	0		
Delaware	2	0	7	
Florida	7	6	61	15
Georgia	1	0		
Hawaii			2	0
Idaho	3	2	9	0
Illinois	10	5	8	1
Indiana	9	2	7	2
Iowa	7	2		
Kansas	1	1		
Kentucky	4	2	79	31
Louisiana	4	4	99	37
Maine	2	1	8	0
Maryland			6	1
Massachusetts	6	2	17	1
Michigan	9	3	11	1
Minnesota	3	1		
Mississippi				
Missouri	2	2	7	
Montana	2	0		
Nebraska	1	0	1	
Nevada				
New Hampshire	2	1	4	0
New Jersey	30	6	6	0
New Mexico	2	1	9	1
New York	24	1	7	
North Carolina			4	3
North Dakota			1	1
Ohio	2	0	15	10
Oklahoma	2	1	58	25
Oregon				
Pennsylvania	22	7	34	5
Rhode Island	2	1		
South Carolina	1	0		
South Dakota	1	0	6	0
Tennessee				
Texas	9	3	172	67
Utah	5	2	7	1
Vermont				
Virginia	4	3	2	0
Washington			1	0
West Virginia	3	1	1	0
Wisconsin	3	0		
Wyoming	3	1	2	0

EPA Enforcement Matrix Notes

Column 1. Civil Criminal Cases: the number of civil criminal cases filed by EPA.

Column 2. Civil Criminal Cases Concluded: the number of civil criminal cases that have been rendered a judgement for or against the defendant.

Column 3. Administrative Orders: the number of administrative orders issued by EPA.

Column 4. Administrative Orders Resolved: the number of administrative orders that have been rendered a judgement for or against the defendant.

Source: US EPA, Office of Water, Compliance Evaluation Section, Washington, DC, 1986.

Pretreatment Matrix

	1	2	3	4	5	6	7	8	9
Alabama	61	60	1	62	59	3	62	56	6
Alaska	2	2		2	2	0	2	1	1
Arizona	15	15		15	15	0	15	15	0
Arkansas	28	27	1	27	24	3	27	20	7
California	100	100		101	98	3	102	94	8
Colorado	26	25	1	26	12	14	28	8	20
Connecticut									
Delaware	5	5		5	5	0	5	4	1
Florida	38	32	6	28	22	6	22	22	0
Georgia	37	37		37	35	2	37	34	3
Hawaii	1	1		1	1	0	1	1	0
Idaho	13	13		13	13	0	13	11	2
Illinois	46	42	4	56	14	42	63	1	62
Indiana	45	45		51	34	17	58	13	45
Iowa	19	19		18	18	0	18	18	0
Kansas	15	15		13	13	0	13	13	0
Kentucky	57	55	2	51	47	4	55	35	20
Louisiana	13	11	2	12	10	2	12	7	5
Maine	15	15		16	12	4	16	9	7
Maryland	15	14	1	17	2	15	16	2	14
Massachusetts	41	34	7	41	23	18	41	17	24
Michigan	113	103	10	115	42	73	115	0	115
Minnesota	6	6		11	6	5	34	8	26
Mississippi									
Missouri	43	43		44	42	2	44	36	8
Montana	6	6		6	0	6	5	0	5
Nebraska									
Nevada	5	5		5	5	0	5	5	0
New Hampshire	11	11		11	10	1	11	2	9
New Jersey	24	22	2	24	20	4	24	14	10
New Mexico	4	4		4	3	1	4	1	3
New York	56	56		56	37	19	56	27	29
North Carolina	130	124	6	120	113	7	115	109	6
North Dakota	3	3		3	1	2	3	0	3
Ohio	99	96	3	104	65	39	113	4	109
Oklahoma	20	19	1	20	18	2	20	13	7
Oregon	20	20		21	21	0	21	21	0
Pennsylvania	85	84	1	85	49	36	87	39	48
Rhode Island	13	13		13	10	3	13	7	6
South Carolina	61	56	5	55	48	7	63	17	46
South Dakota	2	2		2	2	0	2	1	1
Tennessee	81	76	5	48	43	5	48	5	43
Texas	61	60	1	59	53	6	60	40	20
Utah	13	13		13	4	9	13	4	9
Vermont									
Virginia	25	25		25	19	6	27	17	10
Washington	9	7	2	6	6	0	6	4	2
West Virginia	7	7		8	5	3	8	1	7
Wisconsin	23	23		23	19	4	23	10	13
Wyoming	3	2	1	2	0	2	2	0	2

Pretreatment Matrix Notes

Columns 1., 4., 7. Pretreatment Programs Required: number of pretreatment programs in each state that have been required by the approval authority.*

Columns 2., 5., 8. Pretreatment Programs Approved: number of pretreatment programs in each state that have been approved by the approval authority

Columns 3., 6., 9. Pretreatment Programs Unapproved: number of pretreatment programs in each state not yet approved by the approval authority.

* Approval authority can be either states that have been delegated the authority for the pretreatment program, or EPA regions.

Source: Pretreatment Program Approval Status List, US EPA, Permits Division, Office of Water Enforcement and Permits, Wash., D.C., for the quarters ending June 30, 1987; June 30, 1985; and September 30, 1984.

Discharger Compliance Matrix I

	1	2	3	4	5	6	7	8	9
Alabama	111	7	6	86	16	19	9	0	0
Alaska	310	8	3	19	3	16	0	0	0
Arizona	18	0	0	18	0	0	6	1	17
Arkansas	54	11	20	58	19	33	2	1	50
California	90	3	3	155	13	8	8	0	0
Colorado	44	6	14	68	3	4	8	0	0
Connecticut	97	16	16	67	7	10	1	0	0
Delaware	23	5	22	14	1	7	0	0	0
Florida	164	5	2	110	22	20	3	0	0
Georgia	57	1	2	103	8	8	6	0	0
Hawaii	15	0	0	11	1	9	4	0	0
Idaho	36	7	19	28	7	25	2	0	0
Illinois	103	13	13	177	17	10	4	0	0
Indiana	86	7	8	101	28	28	4	2	50
Iowa	31	3	10	63	1	2	1	1	100
Kansas	14	2	14	42	1	2	3	0	0
Kentucky	212	5	2	55	4	7	4	0	0
Louisiana	151	3	2	74	23	31	2	1	50
Maine	29	4	13	63	6	10	1	1	100
Maryland	52	5	10	36	10	28	9	0	0
Massachusetts	83	11	13	102	13	13	0	0	0
Michigan	118	9	8	98	16	16	0	0	0
Minnesota	27	1	4	50	12	24	0	0	0
Mississippi	40	0	0	44	1	2	0	0	0
Missouri	50	3	6	82	9	11	3	0	0
Montana	19	3	16	26	0	0	0	0	0
Nebraska	27	1	4	43	5	12	0	0	0
Nevada	3	1	33	10	0	0	0	0	0
New Hampshire	29	7	24	40	2	5	1	0	0
New Jersey	164	25	15	155	25	16	3	1	33
New Mexico	14	2	14	21	3	14	1	1	100
New York	154	17	11	236	15	6	4	0	0
North Carolina	90	1	1	122	13	11	6	0	0
North Dakota	7	0	0	16	0	0	2	0	0
Ohio	137	18	13	155	41	26	4	1	25
Oklahoma	32	3	9	56	4	7	4	2	50
Oregon	24	0	0	35	3	9	1	0	0
Pennsylvania	167	26	16	235	28	12	2	0	0
Rhode Island	14	1	7	20	4	20	0	0	0
South Carolina	101	0	0	83	8	10	1	0	0
South Dakota	4	0	0	26	3	12	3	0	0
Tennessee	56	2	4	84	4	5	16	1	6
Texas	226	14	6	249	42	17	6	1	17
Utah	18	1	6	37	7	19	1	0	0
Vermont	7	0	0	30	2	7	0	0	0
Virginia	66	1	2	66	2	3	8	2	25
Washington	43	7	16	45	11	24	4	0	0
West Virginia	71	11	15	34	6	18	0	0	0
Wisconsin	60	4	7	87	3	3	0	0	0
Wyoming	24	1	4	17	1	6	0	0	0

Discharger Compliance Matrix Notes

Column 1. Major Non-Municipal Dischargers: number of major non-municipal facilities, excluding federal facilities, discharging into surface waters.

Column 2. Major Non-Municipal Dischargers in Significant Non-Compliance (SNC): number of major non-municipal facilities in SNC with final effluent limits and/or interim effluent limits*, and/or construction schedules. A discharging facility is considered to be in SNC with final effluent limits if the facility:

a. violates conventional pollutant limits by 40% of the monthly average for 2 months out of the most recent 6 month quarter, or

b. violates the monthly average by 20% for 2 months or more out of the most current 6 for any of the 126 toxic pollutants for which EPA has issued numerical criteria guidelines, or

c. violates any pollutant limit for 4 months out of the most current 6; this is considered chronic non-compliance, a subset of significant non-compliance.

Column 3. Percent in Significant Non-Compliance (SNC): percentage of above total violating established effluent limits and/or construction schedules.

Column 4. Major Publicly Owned Treatment Works (POTWs): number of major POTWs discharging into surface waters.

Column 5. Major Publicly Owned Treatment Works (POTWs) in Significant Non-Compliance (SNC): number of POTWs in SNC with final effluent limits for secondary treatment or better, with interim effluent limits and/or with construction schedules. See number "2" for explanation of SNC.

Column 6. Percent in Significant Non-Compliance (SNC): percentage of above total violating established effluent limits and/or construction schedules.

Column 7. Major Federal Facilities: number of major federal facilities discharging into surface waters.

Column 8. Major Federal Facilities in Significant Non-Compliance (SNC): number of federal facilities in SNC with final effluent limits, with interim effluent limits, and/or with construction schedules. See number "2" for explanation of SNC.

Column 9. Percent in Significant Non-Compliance (SNC): percentage of above total violating established effluent limits and/or construction schedules.

* **Interim Effluent Limits** (IEL) are usually based on a facility's best operating conditions since these apply to discharging facilities that are not operating at full treatment capacity such as plants under construction or which are being upgraded. IELs can also be part of an enforcement action for facilities that have been discharging without a permit and are subject to interim limits until such time that an official permit is issued.

Discharger Compliance Matrix II

	10	11	12	13	14	15	16	17	18
Alabama	111	7	6	63	8	13	9	0	0
Alaska	296	2	1	14	1	7	0	0	0
Arizona	17	0	0	15	0	0	6	1	17
Arkansas	42	6	14	18	3	17	2	1	50
California	85	3	4	113	6	5	6	0	0
Colorado	40	4	10	56	0	0	7	0	0
Connecticut	77	13	17	60	4	8	1	0	0
Delaware	18	2	11	9	1	11	0	0	0
Florida	143	3	2	63	8	13	3	0	0
Georgia	51	1	2	63	5	8	6	0	0
Hawaii	15	0	0	6	0	0	4	0	0
Idaho	35	7	20	27	7	26	2	0	0
Illinois	102	13	13	110	8	7	4	0	0
Indiana	83	7	8	80	21	26	4	2	50
Iowa	31	3	10	49	0	0	1	1	100
Kansas	14	2	14	41	1	2	3	0	0
Kentucky	202	5	2	51	2	4	4	0	0
Louisiana	127	2	2	30	7	23	1	0	0
Maine	27	4	15	61	5	8	1	1	100
Maryland	44	5	11	18	4	22	5	0	0
Massachusetts	72	10	14	62	5	8	0	0	0
Michigan	106	7	7	72	8	11	0	0	0
Minnesota	27	1	4	43	10	23	0	0	0
Mississippi	40	0	0	27	1	4	0	0	0
Missouri	50	3	6	58	6	10	3	0	0
Montana	19	3	16	22	0	0	0	0	0
Nebraska	27	1	4	41	5	12	0	0	0
Nevada	3	1	33	6	0	0	0	0	0
New Hampshire	26	6	23	25	2	8	1	0	0
New Jersey	146	22	15	90	16	18	1	1	100
New Mexico	13	2	15	17	2	12	1	1	100
New York	151	14	9	197	14	7	4	0	0
North Carolina	84	1	1	104	6	6	6	0	0
North Dakota	7	0	0	16	0	0	2	0	0
Ohio	109	8	7	53	8	15	3	0	0
Oklahoma	26	2	7	36	2	6	2	1	50
Oregon	24	0	0	32	3	9	1	0	0
Pennsylvania	143	22	15	165	17	10	2	0	0
Rhode Island	12	1	8	12	1	8	0	0	0
South Carolina	101	0	0	62	4	6	0	0	0
South Dakota	3	0	0	19	2	11	3	0	0
Tennessee	56	2	4	61	1	2	16	1	6
Texas	215	12	6	155	20	13	5	0	0
Utah	18	1	6	17	1	6	1	0	0
Vermont	6	0	0	17	0	0	0	0	0
Virginia	54	0	0	50	1	2	6	0	0
Washington	36	7	19	26	5	19	4	0	0
West Virginia	66	10	15	28	4	14	0	0	0
Wisconsin	60	4	7	86	3	3	0	0	0
Wyoming	24	1	4	13	1	8	0	0	0

Discharger Compliance Matrix II Notes

Column 10. Major Non-Municipal Dischargers On Final Effluent Limits : number of major non-municipal facilities, excluding federal facilities, considered to be in final operating condition and therefore subject to final effluent limits.

Column 11. Major Non-Municipal Dischargers in Significant Non-Compliance (SNC) with Final Effluent Limits : number of major non-municipal facilities in SNC with final effluent limits. See number "2" for explanation of SNC.

Column 12. Percent in Significant Non-Compliance (SNC): percentage of above total violating established effluent limits specified on permit.

Column 13. Major Publicly Owned Treatment Works (POTWs) on Final Effluent Limits for Secondary or Better: number of major POTWs considered to be in final operating condition and therefore subject to final effluent limits for secondary or advanced treatment.

Column 14. Major Publicly Owned Treatment Works (POTWs) in Significant Non-Compliance (SNC) with Final Effluent Limits: number of POTWs in SNC with final effluent limits. See number "2" for explanation of SNC.

Column 15. Percent in Significant Non-Compliance (SNC) with Final Effluent Limits : percentage of above total violating established effluent limits specified on permit.

Column 16. Major Federal Facilities on Final Effluent Limits: number of major federal facilities considered to be in final operating condition and therefore subject to final effluent limits.

Column 17. Major Federal Facilities in Significant Non-Compliance (SNC) with Final Effluent Limits: number of federal facilities in SNC with final effluent limits. See number "2" for explanation of SNC.

Column 18. Percent in Significant Non-Compliance (SNC) with Final Effluent Limits : percentage of above total violating established effluent limits on permit.

Discharger Compliance Matrix III

	19	20	21	22	23	24	25	26	27
Alabama	20	0/ 3/ 3	0/ 15/ 15	23	2/ 6/ 8	9/ 26/ 35	0	0/ 0/ 0	0/ 0/ 0
Alaska	14	6/ 0/ 6	43/ 0/ 43	5	0/ 2/ 2	0/ 40/ 40	0	0/ 0/ 0	0/ 0/ 0
Arizona	1	0/ 0/ 0	0/ 0/ 0	3	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Arkansas	12	2/ 3/ 5	17/ 25/ 42	40	5/ 11/ 16	13/ 28/ 40	0	0/ 0/ 0	0/ 0/ 0
California	5	0/ 0/ 0	0/ 0/ 0	42	2/ 5/ 7	5/ 12/ 17	2	0/ 0/ 0	0/ 0/ 0
Colorado	4	0/ 2/ 2	0/ 50/ 50	12	1/ 2/ 3	8/ 17/ 25	1	0/ 0/ 0	0/ 0/ 0
Connecticut				17	2/ 1/ 3	12/ 6/ 18	0	0/ 0/ 0	0/ 0/ 0
Delaware	5	1/ 2/ 3	20/ 40/ 60	5	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Florida	21	1/ 1/ 2	5/ 5/ 10	47	8/ 6/ 14	17/ 13/ 30	0	0/ 0/ 0	0/ 0/ 0
Georgia	6	0/ 0/ 0	0/ 0/ 0	40	1/ 2/ 3	3/ 5/ 8	0	0/ 0/ 0	0/ 0/ 0
Hawaii	0	0/ 0/ 0	0/ 0/ 0	5	0/ 1/ 1	0/ 20/ 20	0	0/ 0/ 0	0/ 0/ 0
Idaho	1	0/ 0/ 0	0/ 0/ 0	1	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Illinois	1	0/ 0/ 0	0/ 0/ 0	67	5/ 4/ 9	7/ 6/ 13	0	0/ 0/ 0	0/ 0/ 0
Indiana	3	0/ 0/ 0	0/ 0/ 0	21	0/ 7/ 7	0/ 33/ 33	0	0/ 0/ 0	0/ 0/ 0
Iowa	0	0/ 0/ 0	0/ 0/ 0	14	0/ 1/ 1	0/ 7/ 7	0	0/ 0/ 0	0/ 0/ 0
Kansas	0	0/ 0/ 0	0/ 0/ 0	1	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Kentucky	10	0/ 0/ 0	0/ 0/ 0	4	1/ 1/ 2	25/ 25/ 50	0	0/ 0/ 0	0/ 0/ 0
Louisiana	24	0/ 1/ 1	0/ 4/ 4	44	3/ 13/ 16	7/ 30/ 36	1	0/ 1/ 1	0/ 100/ 100
Maine	2	0/ 0/ 0	0/ 0/ 0	2	1/ 0/ 1	50/ 0/ 50	0	0/ 0/ 0	0/ 0/ 0
Maryland	8	0/ 0/ 0	0/ 0/ 0	18	3/ 3/ 6	17/ 17/ 33	4	0/ 0/ 0	0/ 0/ 0
Massachusetts	11	0/ 1/ 1	0/ 9/ 9	40	5/ 3/ 8	13/ 8/ 20	0	0/ 0/ 0	0/ 0/ 0
Michigan	12	0/ 2/ 2	0/ 17/ 17	26	4/ 4/ 8	15/ 15/ 30	0	0/ 0/ 0	0/ 0/ 0
Minnesota	0	0/ 0/ 0	0/ 0/ 0	7	1/ 1/ 2	14/ 14/ 29	0	0/ 0/ 0	0/ 0/ 0
Mississippi	0	0/ 0/ 0	0/ 0/ 0	17	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Missouri	0	0/ 0/ 0	0/ 0/ 0	24	0/ 3/ 3/	0/ 13/ 13	0	0/ 0/ 0	0/ 0/ 0
Montana	0	0/ 0/ 0	0/ 0/ 0	4	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Nebraska	0	0/ 0/ 0	0/ 0/ 0	2	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Nevada	0	0/ 0/ 0	0/ 0/ 0	4	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
New Hampshire	3	1/ 0/ 1	33/ 0/ 33	15	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
New Jersey	18	2/ 1/ 3	11/ 6/ 17	65	2/ 7/ 9	3/ 11/ 14	2	0/ 0/ 0	0/ 0/ 0
New Mexico	1	0/ 0/ 0	0/ 0/ 0	4	1/ 0/ 1	25/ 0/ 25	0	0/ 0/ 0	0/ 0/ 0
New York	3	2/ 1/ 3	67/ 33/ 100	39	0/ 1/ 1	0/ 3/ 3/	0	0/ 0/ 0	0/ 0/ 0
North Carolina	6	0/ 0/ 0	0/ 0/ 0	18	4/ 3/ 7	22/ 17/ 39	0	0/ 0/ 0	0/ 0/ 0
North Dakota	0	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Ohio	28	0/ 10/ 10	0/ 36/ 36	102	6/ 27/ 33	6/ 26/ 32	1	0/ 1/ 1	0/ 100/ 100
Oklahoma	6	0/ 1/ 1	0/ 17/ 17	20	0/ 2/ 2	0/ 10/ 10	2	0/ 1/ 1	0/ 50/ 50
Oregon	7	0/ 0/ 0	0/ 0/ 0	3	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Pennsylvania	24	0/ 4/ 4	0/ 17/ 17	70	3/ 8/ 11	4/ 11/ 16	0	0/ 0/ 0	0/ 0/ 0
Rhode Island	2	0/ 0/ 0	0/ 0/ 0	8	0/ 3/ 3	0/ 38/ 38	0	0/ 0/ 0	0/ 0/ 0
South Carolina	0	0/ 0/ 0	0/ 0/ 0	21	2/ 2/ 4	10/ 10/ 19	1	0/ 0/ 0	0/ 0/ 0
South Dakota	1	0/ 0/ 0	0/ 0/ 0	7	1/ 0/ 1	14/ 0/ 14	0	0/ 0/ 0	0/ 0/ 0
Tennessee	0	0/ 0/ 0	0/ 0/ 0	23	3/ 0/ 3	13/ 0/ 13	0	0/ 0/ 0	0/ 0/ 0
Texas	11	1/ 1/ 2	9/ 9/ 18	94	5/ 17/ 22	5/ 18/ 23	1	0/ 1/ 1	0/ 100/ 100
Utah	0	0/ 0/ 0	0/ 0/ 0	20	0/ 6/ 6	0/ 30/ 30	0	0/ 0/ 0	0/ 0/ 0
Vermont	1	0/ 0/ 0	0/ 0/ 0	13	2/ 0/ 2	15/ 0/ 15	0	0/ 0/ 0	0/ 0/ 0
Virginia	12	0/ 1/ 1	0/ 8/ 8	16	0/ 1/ 1	0/ 6/ 6	2	0/ 2/ 2	0/ 100/ 100
Washington	0	0/ 0/ 0	0/ 0/ 0	19	3/ 3/ 6	16/ 16/ 32	0	0/ 0/ 0	0/ 0/ 0
West Virginia	5	0/ 1/ 1	0/ 20/ 20	6	2/ 0/ 2	33/ 0/ 33	0	0/ 0/ 0	0/ 0/ 0
Wisconsin	0	0/ 0/ 0	0/ 0/ 0	1	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0
Wyoming	0	0/ 0/ 0	0/ 0/ 0	4	0/ 0/ 0	0/ 0/ 0	0	0/ 0/ 0	0/ 0/ 0

Discharger Compliance Matrix III Notes

Column 19. Major Non-Municipal Dischargers Not on Final Effluent Limits: number of non-municipal facilities, excluding federal facilities, not considered to be in final operating condition.

Column 20. Major Non-Municipal Facilities In Significant Non-Compliance (SNC) with Construction Schedules (CS)/Interim Effluent Limits (IEL)/Total: number of non-municipal dischargers in SNC with construction schedules, the number of non-municipal discharger in SNC with interim effluent limits, and the total in SNC with construction schedules and/or interim effluent limits. See number "2" for explanation of SNC.

Column 21. Percent in Significant Non-Compliance (SNC) with Construction Schedules (CS)/ Interim Effluent Limits (IEL)/Total: percentage of above totals violating established construction schedules and/ or interim effluent limits.

Column 22. Major Publicly Owned Treatment Works (POTWs) Not on Final Effluent Limits : number of major POTWs not considered to be in final operating condition.

Column 23. Major Publicly Owned Treatment Works (POTWs) in Significant Non-Compliance (SNC) with Construction Schedules (CS)/Interim Effluent Limits (IEL)/Total: number of POTWs in SNC with construction schedules, with interim effluent limits and the total in SNC. See number "2" for explanation of SNC.

Column 24. Percent in Significant Non-Compliance (SNC) with Construction Schedules (CS)/Interim Effluent Limits (IEL)/Total: percentage of above totals violating established construction schedules and/ or interim effluent limits.

Column 25. Major Federal Facilities Not on Final Effluent Limits: number of major federal facilities not considered to be in final operating condition.

Column 26. Major Federal Facilities in Significant Non-Compliance (SNC) with Construction Schedules (CS)/Interim Effluent Limits (IEL)/Total: number of federal facilities in SNC with construction schedules, with interim effluent limits and the total in SNC. See number "2" for explanation of SNC.

Column 27. Percent in Significant Non-Compliance (SNC) with Construction Schedules (CS)/ Interim Effluent Limits (IEL)/Total: percentage of above totals violating established construction schedules and/ or interim effluent limits.

Source: US EPA, Office of Water Enforcement and Permits, Washington, DC, for the quarter ending 3/ 31/87.

EPA Inspections Matrix

	1	2	3	4	5	6	7	8	9	10	11	12
Alabama	10	6	13	1			1				1	
Alaska	5		55		1					1	1	
Arizona		4	14	2	1	2		9		4	7	
Arkansas	8	10	50	1	2			1	1	8	11	8
California		13	36	1	5			9		4	2	
Colorado	4		10				1	5		8	3	6
Connecticut			11		10			2				
Delaware		1								5	3	3
Florida	37	21	132	1	14		2	6			16	4
Georgia	6	6					1					
Hawaii			2									
Idaho	1		4		4			22			5	
Illinois	2	14	11		2	-	4	12		1	2	1
Indiana	3	12	18		3	2	6	14	1		3	
Iowa	7		1		2					4	2	3
Kansas	5	1	2									
Kentucky	12	3	26		3			2	2		11	
Louisiana	6	8	49	3	2			2	2	1	4	1
Maine	4		12					10		1	1	1
Maryland	1		5					3				
Massachusetts	2		26		26		1	9		8	5	7
Michigan	1	6	36				3	2		1	8	
Minnesota		3	5				1			1	1	1
Mississippi	4	3	4					1				
Missouri	20	1	8		4			5	2	2	6	2
Montana			4									
Nebraska	8	8	3		1		1	1		1	2	
Nevada												
New Hampshire	1		8		11			4		6	1	6
New Jersey	25	7	14	6				29			1	
New Mexico	2	1	3					1		1		1
New York	20		19	5	1			54		15	8	
North Carolina	23	4	6	2				1				
North Dakota					1					3		3
Ohio	1	10	41		3	5	12	10	2		8	
Oklahoma	5	4	18	1	2			2		1	4	1
Oregon			2									
Pennsylvania	3	12	18		11			3		16	47	16
Rhode Island			12					4				
South Carolina	8	1		1					2			
South Dakota	3		7		8		1	4		1	2	1
Tennessee	10	9		1			1	2				
Texas	15	33	121	1	3			9		5	24	5
Utah	7		10		7			3		8	4	8
Vermont	7							4				
Virginia		2			3			1		6	14	6
Washington			3					1			1	
West Virginia		1	16									
Wisconsin	1	16	8		2			4	5		1	
Wyoming	9		4							2		2

EPA Inspections Matrix Notes

Column 1. Performance Audit Inspection (PAI): number of PAI's conducted in the state by EPA. PAI's focus on quality assurance of the permittee's self-monitoring program by evaluating permittee performance and/or simulating the steps in the NPDES self-monitoring process, including sample collection, flow measurement, lab analyses, data workup and reporting.

Column 2. Compliance Biomonitoring: number of compliance biomonitoring inspections conducted in the state by EPA. Compliance Biomonitoring includes analyzing effluent samples for toxic pollutants, reviewing permittee records and reporting systems.

Column 3. Compliance Evaluation Inspection (CEI): number of compliance evaluations conducted in the state by EPA. No water samples are taken. CEI's are based on record reviews and walk-through surveys of a facility. Influent and effluent are usually observed. The inspection averages 2-3 days. EPA frequently uses CEI's as routine inspections.

Column 4. Diagnostic: number of diagnostic inspections conducted in the state by EPA. These inspections focus on Construction Grant facilities (municipal wastewater treatment plants) and basically address noncompliance problems.

Column 5. Industrial User Inspection: number of industrial user inspections conducted in the state by EPA. Industrial User Inspections are inspections of the industrial indirect discharger conducted by the control authority for the pretreatment program (usually the POTW but in some cases the state or EPA) to insure that treatment processes are functioning properly, adequate records are being kept, no changes in production rates have taken place, and stored chemicals are properly controlled. Time spent on this type of inspection varies with the complexity of the industry; anywhere from a couple of hours to a couple of days. These inspections may or may not include sampling.

Column 6. Enforcement Case Support: the number of actions EPA has taken once a violation is detected; an effort on the part of EPA to document a violation.

Column 7. Reconnaissance Inspection (RI's): number of reconnaissance inspections conducted in the state by EPA. RI's represent a quick look at a discharger's effluent when reports and other indications of permit compliance are positive.

Column 8. Compliance Sampling Inspection (CSI): number of CSI's conducted in the state by EPA. In a CSI, a representative sample(s) of a permittee's effluent is collected and chemically analyzed. The results are used for a variety of reasons: to verify the accuracy of the permittee's self-monitoring program and reports, to gather evidence for enforcement proceedings, and to determine the quantity and quality of effluents. A CSI includes the same objectives and tasks as a CEI and is more resource intensive than a PAI.

Column 9. Toxics Inspection: number of toxics inspections conducted in the state by EPA. Toxics inspections check for compliance with particular chemical limits set out in the discharge permit. Includes effluent sampling.

Column 10. Pretreatment Audit: number of pretreatment audits conducted in the state by EPA. Pretreatment Audits are audits of the control authority's pretreatment program. They are used to monitor how the POTW assesses compliance and initiates and carries out enforcement activities. POtWs' policies and procedures, staffing levels, and recordkeeping are evaluated. This includes interviews with staff and field visits with POtW personnel, but does not include effluent sampling.

Column 11. Pretreatment Compliance Inspection (PCI): number of PCI's conducted in the state by EPA. PCI's are similar to but not as extensive as the pretreatment audit. They focus on recordkeeping and are more standardized.

Column 12. Industrial User Inspection with Pretreatment Audit: number of industrial user inspections with a pretreatment audit conducted in the state by EPA. This inspection focuses on the POtW's procedures in regulating the industrial user discharging into the treatment plant. A pretreatment audit could include accompanying POTW staff on an inspection of an industrial user.

Source: U.S. EPA, Office of Water, Compliance Evaluation Section, Washington, D.C., July 1986-June 1987.

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1. Governor Anthony S. Earl, "Budget Puts Environment At Risk," *State Government News*, February 1986, pp.8-10.

2. *National Water Quality Inventory: 1987 Report to Congress*, USEPA, p. 10.

3. *The Farmland Project of the National Association of State Departments of Agriculture*, Washington, D.C. 1986.

4. U.S. EPA Ofice of Water, Compliance Evaluation Section, 1987.

5. "Numeric Criteria for Toxic Pollutants in State Water Quality Standards," U. S. EPA Office of Water Regulation and Standards, April 28, 1986.

6. "Putting Teeth in the Law," Boston Globe, March 10, 1987, p. 17.

7. Joel Hirschhorn, Office of Technology Assessment, 1987.

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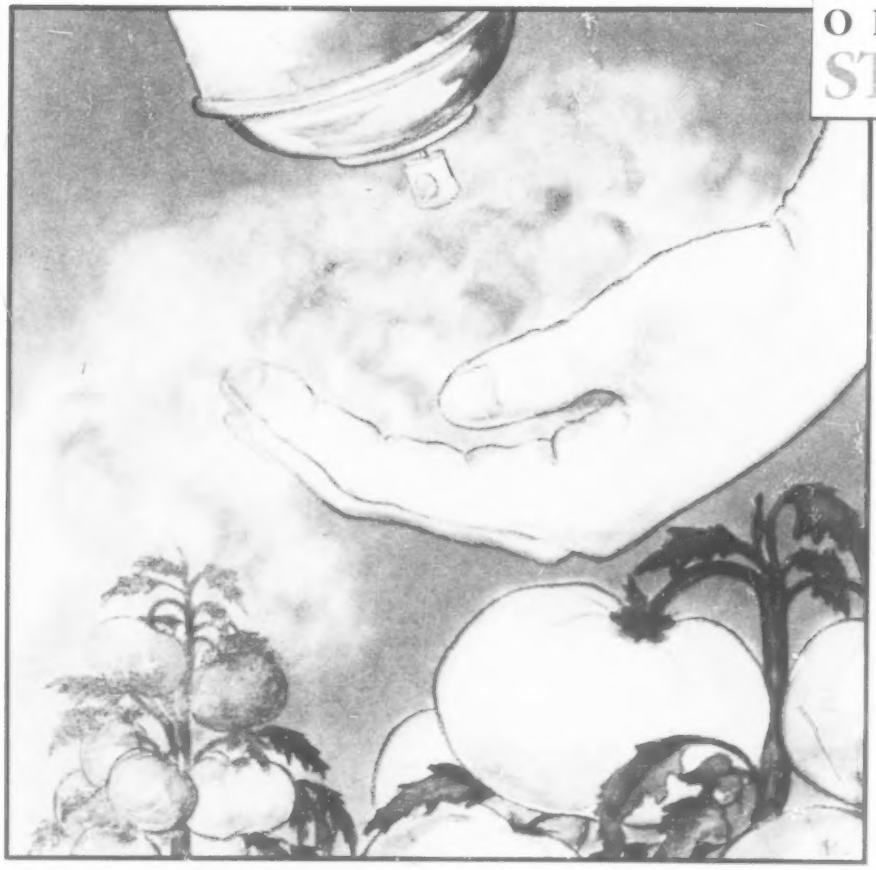

REDUCING PESTICIDE CONTAMINATION

2

FOCUS PAPER

RENEW AMERICA PROJECT

Prepared by:

Nancy Nickell and Scott Ridley
The Renew America Project
May 1988

The Renew America Project is a non-profit, tax-exempt educational organization dedicated to the efficient use of all natural resources. The Project provides individual citizens, state agencies and private organizations with information to assist grassroots change to ensure a clean, safe and livable environment for future generations. For further information on the Renew America Project or to obtain additional copies of this report contact: Renew America, 1001 Connecticut Avenue, N.W., Suite 719, Washington, D.C. 20036, (202) 466-6880. See page 32 for ordering information.

Introduction

The purpose of the Pesticide Focus Paper, one of six focus papers designed to supplement the data in the 1988 State of the States report, is to provide more detailed information on the status of pesticide programs and policies in the fifty states. It provides a national picture of efforts to minimize contamination through maps, matrices, and explanation of key issues, and it allows comparison of the strength of state programs and policies. It is not intended to be a comprehensive assessment of environmental conditions in each state, but an accurate measure of key legislation and programs states have put in place to protect food, water, livestock, wildlife and public health.

The drift of pesticides onto non-target land, the contamination of groundwater, state programs to test for pesticide residues in food, state initiatives in banning or restricting pesticides, and protection of farmworkers are among the issues we have examined. Also briefly expored is state support for non-chemical pest control. As briefly explored is state support for non-chemical pest control. As the federal government continues to shift greater responsibility for environmental issues to the states, public awaremenss of state progress on minimizing pesticide contimination, or the comparative lack of progress, is critical. For information beyong the scope of this report please see the contact list on page 31.

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PESTICIDE USE

Points for Policies & Programs

10-9		CA, MA, TX
8-7		CT, HI, ME, MN, NH, NY, WI
6-5		AZ, FL, IA, LA, MI, NJ, NC, OH, OR, RI, VT, WA
4-3		AR, IL, IN, KS, KY, MD, MS, MO, MT, NE, ND, SC, WV
2-1		AL, AK, CO, DE, GA, ID, NV, NM, OK, PA, SD, TN, UT, VA, WY

Key to reading the map

Example: California - Best Overall

10 points for policies & programs

Pesticide use (ooo's/lbs.)

31,150 lbs. of pesticide active ingredients used per year

Pesticide Use Source: Leonard Gianessi
Resources for the Future, 1987

Policies & Programs Source:
The Fund for Renewable Energy and the Environment, 1988

Reducing Pesticide Contamination

In the middle of July 1985, 1,350 people in California reported symptoms of poisoning after eating watermelons found to be tainted with aldicarb. Officials were troubled by the fact that pesticides containing aldicarb were not supposed to be used on melons. Even more troubling, state researchers found the contaminated melon in many cases showed residues well below those the federal Food and Drug Administration could detect.

Ultimately, more than a million watermelons were ordered destroyed to stop the spread of illness. Dr. Robert Haines, the former Union Carbide scientist who had developed the pesticide, recommended banning its production and use in the United States and abroad.1

At the same time, farm workers called for the banning of five pesticides commonly used on grapes because of the danger the chemicals posed to workers in the field. A threat to groundwater was also evident as tests done by the U.S. Geological Survey showed widespread contamination at water sampling stations.

These and other events supported a growing realization of the dangers posed by chemicals used for agricultural production, insect and rodent extermination, and even lawn and plant care. Amid mounting concern, in 1986 the Environmental Protection Agency moved pesticides to the top of its pollutant list. It was a far cry from the future that had once been envisioned for pesticides.

Hope and Reality

With the postwar hopes of the 1940's, pesticides were developed as a way to bring modern chemistry into the fields to feed the world's hungry populations and boost farm income. Effective use of insecticides and rodenticides opened the way for development of herbicides to kill weeds, as well as fungicides to reduce spoilage during storage of harvested crops. Pesticide use in the U.S. rose from 200,000 pounds per year in the 1950's, to 300 million pounds by 1966, and to more than one billion pounds by 1987.2

Part of the envisioned agricultural bounty arrived. Food production in the United States doubled over 1930 outputs. Due to new technologies, labor-saving machinery, chemical fertilizers, and pesticides, one hour of farm labor today produces 16 times as much food as it did in the 1920's.

But along with these gains, crop losses have also increased. Farmers today still lose the same proportion of their produce as they have for decades—one third. Increasing resistance of insects to pesticides accounts for part of the problem. About 450 species of insects are considered resistant to some form of insecticide, and 20 species are apparently immune to all insecticides. To address this resistance, more frequent use of pesticides and new and more expensive chemicals have been required.

Costs for pesticides and chemical fertilizers are estimated to account for 30-50 percent of farm production expenses. And the use of pesticides is believed to be responsible for an influx of secondary pests that overrun fields after primary pests and natural predators have been killed off.3

Uncertainty over the total volume of pesticides used each year and a lack of recordkeeping is a fundamental problem.

More than 50,000 pesticides with some 700 active ingredients are currently registered for use in the United States. About 25 percent of all pesticides used in 1985 were applied to non-agricultural purposes such as lawn care and wood preservatives. This adds up to 240 million pounds of active ingredients for comercial lawn care as well as industrial and governmental pest control. Home gardeners used 100 million more pounds.

In 1986 a total of 660 million pounds of the 186 most common active ingredients were used on the 75 most common crops. Four crops — corn, soybeans, wheat and cotton — account for the bulk of agricultural pesticides (70 percent of the insecticides and 85 percent of the herbicides.)

Some experts claim that the amount of pesticides being used is more than double the estimated total of one billion pounds per year. For example, Resources For the Future, a Washington D.C environmental research group, estimated in 1986 that California uses more than 31 million pounds of pesticide active ingredients per year. California's Department of Food & Agriculture has estimated that 78 million pounds were used in the state in 1985.

Regardless of disagreements over the volume of pesticides used, no one debates the fact that many pesticides are highly toxic and have come to permeate our environment. Of the total amount of pesticides used, only 10 percent is estimated to reach its target. The rest is scattered in soil and water, and carried off by the wind. Concern has grown not

only at the federal level, but among state governments as well, over what to do about pesticide contamination of groundwater, food, and farm workers.

Federal and State Oversight

The fundamental law regulating pesticides is the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). It gives the federal Environmental Protection Agency authority to approve pesticide registration and use based on label information and other data. States are delegated authority in only two areas: enforcing label restrictions and training pesticide applicators.

However, states can go beyond the label to restrict the time and manner of application; stop the use of certain pesticides on certain crops; require stringent notification procedures for workers and those who might be affected by the drift of pesticide onto non-target land; require farmers to give field workers detailed information on the risks of the pesticide; set longer periods for worker re-entry to fields that have been sprayed; conduct blood monitoring of workers exposed to pesticides and require assistance for emergency medical help; reduce the allowable residue levels for pesticides in food and sample them; and require that records be kept by private applicators and that accidents be reported.

Approximately 600 pesticide-related bills are introduced in state legislatures yearly. Most fail, but a few states, such as California and Texas, lead the federal government in pesticide policy-making.

Both state and federal roles have been evolving, especially during the last 15 years. Under FIFRA federal agencies have traditionally held primary responsibility for oversight of pesticide use. Passed by Congress in 1947 the law was mainly concerned with patents and manufacturing problems. As use of pesticides and their impacts on wildlife increased through the 1950s and 1960s, public concern began to mount, much of it reflected in Rachel Carson's book *Silent Spring*. The book raised especially strong warnings about the effects of DDT on wildlife and precipitated a breakthrough in public understanding about ecosystems, contributing to the eventual ban on DDT use.

As public concern continued to grow, FIFRA was amended in1972 to include health-oriented provisions. It required that EPA register new pesticides to ensure that when used according to directions on the label, the pesticide would not present unreasonable risks to human health or the environment. One of the most important provisons also required the re-registration of pesticides already on the market to assure compliance with these safety provisions.

The work proved to be beyond EPA's capability. A 1983 U.S. General Accounting Office study found that 48 percent of federally registered pesticides lacked data sufficient to assess their potential to cause tumors; roughly 38 percent lacked data on potential to cause birth defects; 48 percent lacked data on reproductive impairment; and 90 percent lacked data on genetic mutations. None of the older pesticides currently in use have been fully tested and assessed for their health and environmental impacts. At the current pace, re-registration of the older pesticides is expected to extend past the year 2000.5

There are other problems with registration of new pesticides as well. For example, EPA does not regularly review the pesticide manufacturers results of efficacy testing which supplies data on the usefulness and risks of the pesticide. The agency's policy is to "let the marketplace decide" what works. State agricultural experiment stations are responsible for efficacy testing before recommending compounds to the USDA state extension agents. But critics say this process is vulnerable to influence from the pesticide industry, which provides funding for agricultural extension stations and helps underwrite much of the cost for testing.

FIFRA also has many limitations. Under FIFRA, EPA cannot ban pesticides because they are ineffective, nor require that users and manufacturers examine all alternatives and choose the least damaging one practicable. Federal laws on other topics, the National Environmental Policy Act (NEPA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA - also known as Superfund) do require this examination of alternatives.

Also under FIFRA, there is no provision allowing citizens to sue for enforcement, a vital component of almost every other federal environmental law. Also limiting enforcement is a provision found in no comparable law. If EPA finds that a pesticide is dangerous to humans or the environment, it is almost impossible for the agency to ban that pesticide, because EPA must "indemnify" the manufacturers by buying the remaining stock from them. Furthermore, money for the purchase must come from the budget of EPA's Office of Pesticide Programs. It has been estimated that indemnification of one chemical, chlordane, would wipe out that department's entire budget for one year.

Some of the current congressional efforts to reform FIFRA would remove these limitations. However, bills to reform various aspects of FIFRA have failed to pass every year since 1980. A debate over the right of states to set residue tolerances for pesticides on food contributed to failure to pass new FIFRA amendments in 1986.

While environmentalists and agrichemical interests fight over FIFRA on Capitol Hill, EPA's staff labors several miles away, falling further and further behind in the effort to complete pesticide safety re-registration tests. Previous testing requirements were more lenient, and some of the results were openly fraudulent. In the mid-1970's, scandal shook the scientific world when inspectors for the Department of Defense found that Industrial Bio-Tech Laboratory, the major government and industry contractor for such studies was falsifying reports. Industrial Bio-Tech data formed the basis for EPA's registration of 140 pesticides.

As a result some states have enacted laws to require health and safety information beyond what the federal government requires, although not all of them request this information routinely. Those states are Arizona, California, Colorado, Michigan, Missouri, North Carolina, Tennessee, Indiana, Massachusetts, New York, Maine, Minnesota, Alabama, Kansas, New Hampshire, Rhode Island and South Carolina.

Generally, as monitoring for pesticides has increased, it has become apparent that inadequate registration of pesticides, improper application, and the failure to utilize alternative methods of farming have resulted in an increased potential for contamination of food and water, as well as increased hazards to farm workers and wildlife.

Water Contamination

Pesticide contamination of groundwater has become a growing nationwide problem. In Kansas, pesticides were detected in 11 percent of the wells tested in 1972. This rose to 72-78 percent of the same wells in 1983 and 1984. In Iowa, pesticide concentrations were found in 55 percent of the wells sampled in one study. In Nebraska, another study showed 70 percent of the wells tested to be contaminated. In some cases the problems were from pesticides or fertilizers that had originally been expected to decay rapidly and pose no damage to water supplies. Other states show similar widespread contamination.[6]

California has found 57 pesticides in 2,887 wells. In Minnesota in 1986, one or more pesticides were detected in 52 percent of 225 private wells; and in an ongoing survey of public wells, one or more pesticides have been detected in 29 percent of 366 wells sampled, although the average concentrations of pesticides found in these wells were below the state health standards. According to EPA, detectable residues of 20 agricultural chemicals have been found in the groundwater of 24 states; contamination believed to have been caused by the normal use of pesticides according to label requirements.

Nationally, the U.S. Geological Survey's Pesticide Monitoring Network which operated from 1975 to 1980 found residues of atrazine at one-quarter of all the water sampling stations. Dieldrin, chlordane and DDT were found at one-third of all sediment sampling stations.

Only seven states lacked programs to test groundwater for pesticides in 1986. Four states: California, Iowa, Wisconsin and Florida have extensive monitoring programs.

Iowa passed legislation in 1987 considered to be in the forefront of efforts to monitor and reduce pesticide contamination of water. Tests indicated that one out of seven of the state's public water supplies contains pesticides. The new groundwater protection law is expected to raise $65 million over a period of five years—with one third of these funds drawn from agricultural sources: higher fertilizer fees, higher pesticide registration fees, and increased pesticide dealer license fees. The law also establishes the Leopold Center for Sustainable Agriculture as an idependent facility. This new research station will explore methods to help Iowa farmers minimize pesticide use.

Pesticide Residues on Food

While rural populations and rural ecosystems face the harshest impact of pesticides, the problem also extends far beyond rural areas into urban markets and onto consumers' tables. Consumers face risk from ingesting water, vegetables and fruits contaminated with pesticide residues, and also from pesticides that have bioaccumulated in fish, livestock, poultry eggs, and milk.

Of the 700 active ingredients in pesticides, 496 may be found in our food supply. Tomatoes, grapes, apples, lettuce and beans are commonly cited as produce likely to carry high pesticide residues. Public and government concern over this contamination is growing. The National Academy of Sciences reported in May 1987 that 90 percent of all fungicides, 60 percent of all herbicides, and 30 percent of all insecticides may cause cancer.

Categories of Ground-Water Vulnerability; Coterminous United States

Source: Agricultural Chemicals in Groundwater: Proposed Pesticide Strategy, U.S. EPA, Office of Pesticides and Toxic Substances, Dec. 1987.

A fundamental problem is that understaffed testing programs and holes in the information EPA uses to set tolerance levels for pesticide residues severely weakens food protection. EPA sets safe levels of pesticide residues based on label information and company-supplied registration data The Food and Drug Administration tests fresh produce and processed food against these standards, while the U.S. Department of Agriculture tests meat to enforce the tolerance levels.

EPA manages to capture only a portion of the danger through the tolerance-setting process. And the FDA and USDA capture only a small amount of the danger outlined by EPA. FDA takes an estimated 12,000 samples of domestic and imported food each year, less than the annual number of samples taken by California's Board of Food and Agriculture.

According to the General Accounting Office, the FDA "does not regularly test food for a large number of pesticides that can be used or may be present on food...FDA does not prevent the marketing of most of the food that it finds to contain illegal pesticide residues, or penalize growers who market food with illegal pesticide residues when FDA is unable to remove it from the market"

There is also the problem of pesticides banned in the United States being used on food that is imported into the country. The General Accounting Office notes: "FDA laboratories generally rely on one of five analytical methods to test imported food samples for illegal pesticide residues. Although these methods are capable of testing for most pesticides banned for use in the United States, cumulatively they can detect less than half the pesticides potentially available in world markets. FDA is limited in its ability to better target testing because it lacks knowledge about which pesticides are being used in foreign countries." GAO has also found that "FDA has been unable to prevent the marketing of about half of the imported fresh fruits and vegetables that it has determined contain illegal pesticide residues. [8]

The authority for states to act to protect food varies widely, and often their testing programs are not any more effective than the FDA's. All but two states have the authority to seize contaminated food, and nine states lack the authority to test for pesticide residues. Twenty-three states have automatic adoptions of FDA rules, leading to quicker action of a tolerance is lowered.

FDA studies on pesticides in the typical adult diet show a decline of DDT and dieldrin since 1965 due to federal bans on the chemicals in the 1970s. But the levels of toxaphene, the major substitute for these chemicals, increased during the period of 1965 to 1982. Residues of pesticides in current use are found in 95 percent of human tissue samples analyzed.

Farm Workers—Most Affected, Least Protected

In addition to contamination of food and water, pesticides present a specific danger to those who manufacture the compounds in chemical plants, apply them in the fields, or work in fields that have been recently sprayed.

Workers in pesticide factories are protected by the Occupational Safety and Health Administration. But the applicators and field laborers are not. They are covered by a small section of FIFRA that was last revised in 1974. Due to a lack of data on pesticide poisonings, it is difficult to estimate the number of incidents nationwide. One epidemiologist working with California data has estimated that 313,000 farm workers in the U.S. may suffer the effects of pesticide-related illness each year, including such acute symptoms as dizziness, vomiting, pin-point pupils, and severe skin rashes. Beyond this estimate, an unknown number of people are believed to endure more subtle effects such as chronic disorders or prolonged depression of an essential nervous system enzyme called *cholinesterase.*

Thirty-seven states currently offer their farm workers only the protections specified in FIFRA. Several other states have right-to-know provisions, but some of these may be ground up in bureaucratic wrangling between various branches of government and gaps between OSHA rules and FIFRA protections.

For example, under current FIFRA provisions, EPA has decided that "no special measures are needed to ensure the safety" of children up to 16 years old working in the fields, a subject of particular concern at OSHA. Most cancer specialists agree, however, that children are more susceptible to dangerous chemicals, because their development can be affected and they have more years ahead in which chemicals can cause cancer or chronic disease.

In terms of treatment for poisoned farm workers, transport for emergency medical treatment is not required by FIFRA; only "first aid and other procedures." At least four states, California, Arizona, New York, and Ohio do require transport; others may also require it under certain labor laws. The degree of protection under FIFRA is also balanced on a scale of costs. The Occupational Safety and Health Act of 1970 theoretically

offers little scope for an assessment of benefits and costs. But FIFRA requires EPA to weigh both benefits and costs in establishing policies for protection of farm workers.

Getting rules and provisions changed is difficult. Farm workers are often handicapped in their attempts to sue for better regulation or enforcement, not only because they are often poorly educated and move frequently, but because many are illegal aliens. An early act of the Reagan administration was to prohibit the Legal Services Corporation, the main source of legal representation for poor people, from representing illegal aliens. Even farm workers who are citizens have an additional barrier peculiar to their occupation. Unlike labor laws, FIFRA has no anti-retaliatory provision to protect workers from firing if they complain about unsafe conditions.

In the meantime, farm workers are left to depend upon regulations that, according to EPA Office of Pesticide Programs Director Douglas Campt offer "no provisons for decontamination, training or medical monitoring and (part 170) does not cover handlers at all. The protective clothing requirements are inadequate (long-sleeved shirt, long-legged pants, hat, shoes, socks). No generic interim reentry intervals are established."

Since 1984, EPA's regulatory efforts to increase farm worker protection have been in process. EPA released a draft of new regulations that it is planning to propose in the spring of 1988, but farm worker advocates have charged that the proposed regulations are full of loopholes. Meanwhile, Texas initiated in 1987 a special right-to-know initiative for farm workers that has received high praise from their advocates. The program features crop sheets, describing risks and protections for farm workers for pesticides likely to be used on the crop being worked. The sheets are written in both English and Spanish and are to be distributed to workers upon request.

However, just as the Texas program was getting underway, OSHA decided to include farmworkers under its hazard communications standard, requiring that they be provided with material safety data sheets (MSDS), documents that are far less readable than Texas' crop sheets. Texas may be stuck with the MSDS if the crop sheets are challenged in court by growers, because the state does not have an occupational safety and health plan approved by OSHA.

Minimizing Pesticide Use

The key to reducing the dangers of pesticide contamination—of water, of food, and of farm workers—lies at the source in minimizing pesticide use. It is a thorny political and economic issue with farmers caught between gaps in government policies and pressure from agribusiness companies that have influence over farming practices.

Despite these problems there are a variety of methods being used and researched to minimize pesticide use in agriculture. Integrated Pest Management (IPM) is one of the most widely accepted practices. IPM generally utilizes crop rotation to take advantage of plant varieties that do not attract the same pests, or are pest resistant. It also targets the use of minimal amounts of pesticides at the most opportune times and conditions. The basic concept is to move away from the conventional technique of spraying pesticides on a pre-arranged schedule, and substituting environmentally sound methods to keep pests below population levels that are economically damaging.

Although precise methods vary from region to region and from crop to crop, IPM is encouraged by government agencies in some states. In California and Maryland, a provision encouraging IPM is written into the pesticide law.

One important aspect of IPM is biological control—the introduction of natural enemies of pests. One method of this is "innoculative release" in which a pest's natural enemies are released to become a permanent part of the ecosystem. Biological control programs have become successful in many parts of the world. An estimated 327 species of natural enemies have been introduced and 55 to 75 percent of the introduction programs are still said to be effective. Because of the extreme care scientists have used in screening natural enemies before release, the environmental cost of this approach has been almost zero.

In addition to insects, biological agents like microbes and other natural enemies can also be harnessed as "living pesticides" that are used periodically in a process called "innundative release." U.S. soybean farmers have long been effectively and economically controlling the Mexican bean beetle by annually releasing a parasitic wasp that the USDA supplies at cost. These biological agents later succumb to natural causes, such as seasonal climate change. The environmental cost of this approach, sometimes coupled with other IPM techniques, is negligible. Reintroduction of pesticides, however, can kill off these natural enemies as well as pests. Nearly all states, supply some money for biological control

research, the largest amounts currently being spent by Florida and Texas.

A controversial new focus of IPM research, especially in California, is biotechnology—producing genetically engineered organisms that can be patented—taking the bio-control concept back full circle to a technologically manufactured "living pesticide." Critics say that some of the research in biotechnology is aimed not at reducing the use of pesticides, but increasing it. They point to herbicide-resistant genes being bred into crop plants to enable the use of herbicides on a broader group of crops.

Jack Doyle of the Environmental Policy Institute in Washington, D.C. says, "When considering the release of genetically-altered organisms into the environment, there are now seven general areas in which key questions need to be asked prior to release in order to determine whether the organism might have some negative or unforeseen impact. These are: 1) Will the organisms survive? 2) Will they multiply? 3) Will they transfer their inserted genetic changes to other organisms? 4) will they be dispersed or transported to new or unintended sites? 5) Will they have a deleterious environmental effect? 6) Will they pose public health risks? and 7) How will they be contained or destroyed should they pose a health or environmental threat?"

The fear is that genetic mutants bred and controlled in the laboratory may undergo severe changes in the field and damage the environment. Not only is there no way of predicting what will happen if these creatures of the laboratory are turned loose in the environment, but the Environmental Protection Agency and its state counterparts have been usurped in the biotech area by regulatory agencies primarily concerned with boosting new technologies. Regulatory control over biotechnology has rested largely with the White House Office of Science & Technology (OSTP), with the backing of the anti-regulatory Office of Management & Budget and the State and Commerce departments.

Doyle argues that new laws need to be written to govern biotechnology, and that EPA should be the lead agency to regulate it. Other critics, such as biogenetic activist Jeremy Rifkin, argue that, given the potential for enormous and irreversible damage, no single body or commission can make decisions on the environmental, sociological, or economic risks from this technology.

According to EPA and the Industrial Biotechnology Association, California and Wisconsin have begun efforts to control biotechnology, but the major regulatory decisions lie beyond the states in the federal arena.

Hope for the Future

After decades of experience with pesticides, it's apparent that there is not going to be a miracle product that will propel agriculture into a new age. Yet, much of the state-level research for agriculture has been financed by chemical companies seeking new products and new markets—in other words, more magic bullets. Thus, hopes for minimizing pesticide use rest in part on the ability of farmers already suffering from a depressed farm economy to make a transition to alternative low chemical imput methods, and federal and state governments to encourage and support this transition.

While requiring less capital, low-input farming methods are usually more labor intensive and, during a two or three year period when land is in transition, crop production and income can decline. Along with research and educational efforts among farmers and farm organizations, a trust fund recently proposed to lay the groundwork for a transition to low-input farming.

The Natural Resources Defense Council and other organizations support the concept of federal trust fund for sustainable agriculture. NRDC says the fund should be dedicated to the support of federal programs beneficial to sustainable agriculture research, and should be funded by a modest excise tax on the use of farm chemicals.

In December 1987, Congress took the first step in this direction by allocating start-up money for low-input agricultural research to several states.

While efforts toward a transition in farming methods are being made, it is essential progress to limit pesticide contamination of groundwater, reduce pesticide residues on food, and protect farm workers. Reform of FIFRA at the federal level to tighten testing and information requirements for pesticide registration, remove indemnification provisions for banned pesticides, and provide better protection for farm workers is essential. States, likewise must upgrade their pesticide policies and increase monitoring and enforcement. Profiles of what states have accomplished on key pesticide issues such as drift, recordkeeping, monitoring and farm worker protection are contained on the matrices in this report.

Pesticide Main Matrix

	1	2	3	4	5	6	7	8	9	10	11
Alabama	2		N		487	16		4	8,685,000	220,000	275.1
Alaska	6			N	28	61		4		3,000	
Arizona	4				247	15		2	4,480,000	125,000	477.8
Arkansas	2		N		319	4.3		4	20,350,000	594,578	493.7
California	1	EDB			201	18	R	1	31,150,000	43,500	6 460
Colorado	5		N		126	3.9		4	7,245,000	96,000	160.4
Connecticut	3	CD			156	62	R	4	662,000	2,000	272.6
Delaware	2			N	154	34		4	1,887,800	4,500	85.4
Florida	5				846	27		3	16,533,600		2 348.9
Georgia	5			N	1220	10		4	18,031,000	696,000	816.4
Hawaii	4	C			654	20		4		4,220	285.2
Idaho	7			N	69	75		4	6,375,500	26,805	544.9
Illinois	7				400	37		3	64,800,000	18,600,000	363.4
Indiana	6				229	90		4	32,960,000	137,034	298.9
Iowa	7				404	35		4	74,200,000	21,500	109.4
Kansas	9				227	31		4	14,020,000	76,300	267.7
Kentucky	3				2300	6.7		4	12,030,000	127,348	533.5
Louisiana	4				292	39		4	14,760,000	210,000	310.7
Maine	2				72	39	R	4	1,397,000	18,875	118.4
Maryland	6				585	15		4	5,028,000	24,900	131.5
Massachusetts	1	C,AL			106	25	R	4	989,000	3,750	169.5
Michigan	5				256	14	R	4	17,825,000	20,081	320
Minnesota	8	C			274	18		3	45,900,000		408.6
Mississippi	6				451	13		4	18,814,000	5,103,065	195.1
Missouri	8				602	47		4	17,869,000	13,073	159.6
Montana	5				129	13		4	5,240,000	84,000	186.4
Nebraska	9				NA	NA		4	31,335,000	51,560	109.3
Nevada	7		N		98	17		4	270,000	26,000	
New Hampshire	5	C			136	59	R	4	249,000	2,750	10.4
New Jersey	6			N	190	86	R	2	2,256,000	15,140	149.2
New Mexico	8			N	216	12		4	1,540,000	325,000	118
New York	8	C			386	20	R	3	9,050,000	10,350	782.3
North Carolina	6				492	19		2	17,860,000	34,400	321.1
North Dakota	6				66	7.5		4	13,390,000	22,900	154.8
Ohio	6				432	24		1	31,900,000	24,000	902.3
Oklahoma	6			N	363	32		4	62,570	309,600	132.6
Oregon	6				71	55		3	5,269,000	7,813	488.2
Pennsylvania	6			N	310	22		3	10,500,000	180,203	149
Rhode Island	8	C			61	4.9		4	145,000	3,780	13.7
South Carolina	5				409	6.6		4	9,338,000	1,368,000	305.5
South Dakota	8				466	13		4	11,014,000	1,020,000	20.5
Tennessee	11				543	41		3	8,916,000	45,061	193.9
Texas	1	EDB			229	57	R	2	26,650,000	449,718	2 308.9
Utah	10				1360	7.9		4	852,000	700	56.5
Vermont	5	TBT			55	29			237,900	5,600	
Virginia	8				430	21		4	6,306,000	88,500	385
Washington	3				97	0		3	8,450,000		301.9
West Virginia	3				139	9.3		4	931,900	3,311	22.1
Wisconsin	8	DF			95	92		3	18,688,000	7,500	823.8
Wyoming	7		N	N	NA	NA		4	1,019,000	3,030	80.8

Matrix Key

1. Drift Restrictions: scale of 1-11 notes extent of provisions such as financial requirements, advance notification, etc. required to regulate drift onto non-target land; "1" indicates most extensive provisions.

2. Banned by State: pesticides banned by state; "C" - Chlordane, "TBT" - Tributyltin, "AL" - Alachlor, "CD" - Cadmium, "DIF" - Dicofol, "EDB" - Ethylene Dibromide.

3. Groundwater Monitoring: "N" indicates state does not have a program to monitor groundwater for pesticide contamination, "*" - developing program.

4. Food Monitoring: "N" indicates state does not have statutory authority to test food for pesticide residues.

5. Total FIFRA Compliance Inspections: number of both agricultural and non-agricultural enforcement inspections (10/1/86-3/31/87).

6. Percent of Actionable Inspections: percentage of inspections finding actionable violations.

7. Record-keeping Requirements for Private Applicators: "R" indicates state requires private applicators to keep records.

8. Farmworker Protection: scale of 1-4 indicates extent of provisions to protect farmworkers on re-entry, advance notification, etc.; "1" most comprehensive; 1-3 goes beyond FIFRA minimum requirements.

9. Active Ingredients Of Pesticide Used: pounds of active ingredients in 184 commonly used pesticides (weighted toward corn crops).

10. Integrated Pest Management Acreage: acreage cultivated using Integrated Pest Managment principles (Illinois acreage over-reported).

11. Biocontrol: 1986 expenditures at state agricultural experiment stations and other cooperating institutions.

Pesticide Matrix Sources

Drift Restrictions: Sarah E. Redfield, *Pesticide Drift, the State of the Law* , Franklin Pierce Law Center, 1984.

Pesticides Banned by State: Staff interviews with state pesticide registration officials, January 1988.

Groundwater Monitoring: EPA Water Quality Inventory Report to Congress, 1984 and EPA *State Program Briefs: Pesticides in Groundwater*, 1986, updates from state officials..
(* Indiana's program is being developed.)

Food Monitoring: Source: *State Law Data*, Food & Drug Administration State Services Branch, Division of Federal-State Relations, Office of Regulatory Affairs, 1986.

Total FIFRA Compliance Inspections: Inspections for both agricultural and non-agricultural use pesticides by the state from October 1, 1986 through March 31, 1987. Data is from EPA's FIFRA Compliance Program.

Percent of Actionable Inspections: Ibid. (Note Nebraska and Wyoming do not have state FIFRA programs).

Recordkeeping Requirements for Private Applicators: Staff interview with Valarie Wilk, Farmworker Justice Fund, January 1988. (Note: The majority of pesticide applications are made by growers on their own land).

Farmworker Protection: Occupational Safety & Health Law Center 1987 surveys, examination of state regulations and staff telephone interviews with state officials.

Active Ingredients of Pesticides Used: (in thousands of pounds) Pounds of active ingredient in 184 commonly used pesticides from 1982 data by Leonard P. Gianessi, *A National Pesticide Usage Data Base*, Resources for the Future, Washington, D.C., 1986.

Acreage Under Supervision of USDA Extension IPM Program:*The National Evaluation of Extension's Integrated Pest Management Programs* Virginia Cooperative Extension Service for the USDA Extension Service, 1987.

Biological Control Funding (thousands of $)) USDA Cooperative State Research Service, 1986 data. (Note: the current Research Information System data base from which these figures are drawn is considered unreliable, but is nonetheless the only information available).

Pesticide Snapshot

California is one state that is moving much faster than the federal government to contain the public health and environmental threats of pesticides. Rather than relying on FIFRA, the state has developed an extensive system of laws regulating pesticides. These laws are essential to oversee the largest agricultural production in the nation.

In total, thirty-three million acres are farmed in California, absorbing 31,150,000 million pounds of active pesticide ingredients per year according to Resources For the Future estimates. California's own estimates in 1985 were even higher: 78 million pounds. Nine million acres are intensively farmed, producing three crops per year. California's agricultural production exceeded $13.9 billion in 1986, 45 percent more than the next leading state. According to the state Board of Food and Agriculture, state and county pesticide regulatory expenditures come to $40 million annually, the same size of EPA's Office of Pesticide Programs annual budget,

One of the most important new measures to regulate pesticides is the California Birth Defects Prevention Act of 1984. Its purpose is to fill many of the gaps in EPA's data. The law requires full toxicology studies, not summaries, be submitted to support the registration of pesticide products in California.

The studies must include data on the pesticide's potential to cause reproductive damage, mutations, cancer and nerve damage. The Birth Defects Prevention Act requires the department to fill any data gaps it identifies for 200 high priority active pesticide ingredients by March 1, 1991. If studies are not submitted voluntarily by registrants, the department is authorized by law to obtain any needed studies and bill registrants for the cost.

The law also contains a provision enabling the Board of Food and Agriculture to: "cancel the registration of or refuse to register any economic poison...for which there is a reasonable effective and practible alternative material procedure which is demonstrably less destructive to the environment."

While EPA requires only that restricted pesticides be applied by certified applicators, California requires not only a permit but also notification before application. This enables the department and county commissioners to trace violations they find through residue monitoring or farm worker poisoning incidents back to specific growers or applicators.

Despite the ambitious scope of the law the California Department of Food & Agriculture is missing preliminary deadlines consolidated by law, which has prompted the Natural Resources Defense Council to file suit against the state.

The Final Scores

	Pesticide Points	Total Points	Overall Ranking
Massachusetts	9	45	1
Wisconsin	7	45	
California	*10	44	3
New Jersey	5	44	
Connecticut	8	43	5
New York	8	42	6
Oregon	6	42	
Florida	6	41	8
North Carolina	5	40	9
Hawaii	8	38	10
Michigan	6	38	
Minnesota	7	38	
New Hampshire	8	38	
Rhode Island	6	37	14
Maine	7	36	
Vermont	6	36	
Maryland	3	35	17
Iowa	5	34	18
Virginia	2	34	
Delaware	2	32	20
Washington	5	32	
Nebraska	3	31	22
Pennsylvania	2	31	
Ohio	6	30	24
Colorado	2	29	25
Illinois	4	29	
Montana	4	29	
Utah	2	29	
Indiana	4	28	29
Georgia	2	27	30
South Dakota	2	27	
North Dakota	5	26	32
West Virginia	4	26	
Arizona	6	25	34
Idaho	2	25	
Kansas	4	25	
South Carolina	3	24	37
Kentucky	4	23	38
Missouri	3	23	
New Mexico	2	22	40
Alabama	2	21	41
Alaska	2	21	
Louisiana	5	20	43
Tennessee	2	20	
Nevada	2	19	45
Oklahoma	2	19	
Texas	9	19	
Arkansas	3	17	48
Mississippi	3	17	
Wyoming	1	15	50

Key:

Reducing Pesticide Contamination Points are based on a scale of 1 to 10. The points were derived from the data in the matricesand measure the strength of state programs and policies to protect the environment. See "Ranking Notes" on page 14 for a detailed explanation.

Total Points consist of a maximum score of 60 points. Each of the six topics in the 1988 main report have a maximum value of 10 points. (The six topics are: Indoor Pollution, Surface Water Protection, Reducing Pesticide Contamination, Land Use Planning, Highway Safety, and Energy Pollution Control). The point values for each topic are added together to give the state's total point score.

Overall Ranking is the ranking of the states based on the total points received for all six topics. In the case of a tie each state is given the same ranking. Example: Both Massachusetts and Wisconsin received 45 points and therefore are tied for first place.

Summary Example: With 32 points, Washington ranks 20th in the nation for the strength of state environmental programs examined. For reducing pesticide contamination, Washington received 5 points on a 10 point scale. The 5 points received for pesticides were added together with the points received for the remaining five topics to equal the total point score of 32.

* **California** was judged to have the strongest programs and policies in reducing pesticide contamination with a maximum of 10 points.

Ranking Notes

The primary indicators of state programs to reduce the dangers of pesticides that were considered in the rankings: drift restrictions, bans on pesticides, groundwater monitoring, state authority for testing pesticide residues on food, requirements for record-keeping by private applicators, and provisions for farmworker protection.

Drift restrictions cover a number of important subtopics, such as: whether financial responsibility or detailed insurance provisions are required; whether drift boundaries are specified in permits; whether advance notification or posting is required. Strong drift restrictions were given significant weight. Also given strong weight was the issuance of bans on pesticides. States lacking groundwater monitoring programs or authority to test for pesticide residues on food had points reduced. Four levels of farmworker protection were also assessed.

The amount of active ingredients used per state represents the best figures available. Biocontrol funding figures and integrated pest management figures are likewise the best figures currently available. They received no weight in the rankings, however.

Applicator Training

The training and experience of those who apply pesticides is an issue critical to minimizing contamination. Information about applicator training programs is not readily accessible, as EPA has not completed a formal survey and state regulatory activity is rapidly increasing. Here is some background material to help citizens judge programs in their own states:

Until the 1972 FIFRA amendments, applicator training developed informally, as some states adopted licensing requirements for commercial operators who did termite spraying and other pest control in buildings. Much of the training was handled by the USDA Extension Service.

In the 1972 FIFRA amendments, pesticide products were divided into two categories: those for general use, whch anyone can legally apply as long as label instructions are followed, and those for restricted use, which can be applied only by, or under the direct supervision of, certified applicators. The law gave the states responsibility to create and administer certification programs upon EPA approval. The law does not require training as a precondition of certification, but only a determination that the individual is competent in the use and handling of pesticides.

Restricted use pesticides generally mean that they have to be applied by a certified applicator. The amount of training for that applicator varies greatly from state to state. There is another hole in the law: "a pesticide shall be considered to be applied under the direct supervision of a certified applicator if the pesticide is applied by a person acting under the direct supervision and the instructions and control of a certified applicator who is available if and when needed, even though such certified applicator is not physically present at the time and place the pesticide is used." According to the EPA Applicator Certification and Training Office in the Office of Pesticide Programs:

- EPA was required to issue standards for determining competency of commercial and private applicators for certification purposes;

- EPA cannot require private applicators (i.e., farmers applying pesticides on their own land) to take an examination for certification, although states have this as an option (The majority of pesticide applications are made by growers on their own land.);

- EPA may require commerical (but not private) applicators, sellers and distributors to maintain and submit records on restricted use products;

- primary enforcement responsibility was given to the states;

- EPA is to cooperate with USDA to educate pesticide users;

- EPA is to make available instructional materials on integrated pest management techniques, but competency cannot be required for certification;

• "significant variations" occur among state programs in coverage of such emergent concerns as groundwater contamination, endangered species, and chronic health effects.

• As of April 1987, nine states do not require retraining or certification of private or all categories of commercial applicators, although three more were considering such programs.

• 30 states require an examination for initial certification of private applicators, another 14 offer an examination as an option. Examination procedures vary from closed-book to open-book, monitored open-book or take-home.

• 37 states provide reexamination at least as an option for renewal of certification, and of these 37, 10 states require reexamination for private applicators to renew their certification. Nine states require reexamination for renewal of certification of commercial applicators.

• six states impose no specific requirements on all categories of commercial applicators for recertification, although they may impose recertification requirements on some of the more than 10 categories.

• only 12 states have issued competency standards for trainers

• 42 states require dealers to be licensed, 14 require dealers to be certified, 48 require dealers to maintain records of each transaction involving a restricted use pesticide.

• 14 states provide for licensing, certification or other methods of verification (e.g. registration) of pesticide consultants in their state plans.

Text Notes

1. "Temik Follow-Up," RE:SOURCES, Environmental Task Force, Washington, D.C., Winter, 1985, p4.

2. "The Economics of Pesticides," EPA Journal, May, 1987, p. 11.

3. "A Fund for Sustainable Agriculture," by Anne E. Kinsinger, Project on Agricultural Conservation and Tax Policy, Natural Resources Defense Council, October, 1987, p 6.

4. *State of the Environment: A View Toward the Nineties*, by the Conservation Foundation, 1987, p. 145.

5. "Pesticides: EPA's Formidable Task to Assess and Regulate Their Risks" U.S. General Accounting Office, October, 1983. "Pesticide Regulation: 1986 Amendments to FIFRA" by James Aidala, Environment and Natural Resources Policy Division, Congressional Research Service, August 5, 1986, p. 7.

6. *A Congressional Agenda to Prevent Groundwater Contamination: Building Capacity to Meet Protection Needs*, (Washington, D.C.: Environmental and Energy Study Institute, 1986) p. 46

7. "Iowa Groundwater Protection Act of 1987, A Summary" by George R. Hallberg, Connie Cousins-Leatherman and Richard Kelly, Iowa Department of Natural Resources.

8. *Pesticides: Need to Enhance FDA's Ability to Protect the Public From Illegal Residues*, U.S. General Accounting Office, October, 1986, p. 47. See also: *Pesticides: Better Sampling Needed on Imported Food*, U.S. GAO, September, 1986.

Farmworker Matrix

	1	2	3	4	5
Alabama					
Alaska					X
Arizona	24 hrs	APL	X	Transport	X
Arkansas					
California	to 75 days	APL, AT	X	Transport	
Colorado					
Connecticut		AN			X(P)
Delaware					
Florida		AN			
Georgia					
Hawaii					X
Idaho					
Illinois		RTK,S			
Indiana					X
Iowa					X
Kansas					
Kentucky					X
Louisiana					
Maine					
Maryland					X
Massachusetts					
Michigan					X
Minnesota		P,RTK,S			
Mississippi					X
Missouri					
Montana					
Nebraska					
Nevada					X
New Hampshire					
New Jersey	48 hrs	O.P.			
New Mexico					X
New York		T,P, RTK		transport	X(P)
North Carolina	24-48 hrs	OP/RTK			X
North Dakota					
Ohio	up to 14 days	A,N	X	Transport	
Oklahoma					
Oregon		T,RTK			X
Pennsylvania		T,N,MSDS			
Rhode Island					
South Carolina					X
South Dakota					
Tennessee		T,MSDS			X
Texas	1-7 days	APLT(cropsh)			
Utah					X
Vermont					X
Virginia					X
Washington		RTK(MSDS)			X
West Virginia					
Wisconsin		A,P,RTK			
Wyoming					

Farmworker Matrix Notes

The first four columns refer to standards more stringent than EPA's FIFRA regulations for farmworker protection.

Column 1 - Re-Entry means a specific period of time which must be allowed to pass between application of the pesticide and the farmworkers' re-entering the field.

Column 2 - Right-to-know information given to the farmworkers about the hazards of pesticides. A=advance notification of application and its hazards. L= in appropriate language, P=posting in the field or on a bulletin board, T=training; O=oral warning; RTK=right to know. This is usually based upon programs designed for factory workers, such as MSDS. The latter are Material Safety Data Sheets giving basic hazard information about chemicals. Texas has carried this further with its crop sheet program, in which readable information is developed in English and Spanish describing the dangers for pesticides likely to be used on a particular crop.

Column 3 - Medical monitoring = blood tests to monitor the level of cholinesterase, an essential enzyme that is depressed by exposure to certain pesticides.

Column 4 - Transport = the right to transport for emergency medical care after exposure to pesticides. Although California and Arizona have written this into their farmworker regulations, most states have such protection only under their occupational safety and health or workmen's compensation laws, which usually do not apply to farmworkers.

Column 5 - State plan = states which have authority from the federal Occupational Safety and Health Administration to run their own safety and health plans. this causes some potential legal problems with states covering farmworkers for pesticides under labor rather than environmental laws - please see text for details.

Information was gathered in cooperation with the Occupational Safety and Health Law Center, Washington, D.C., which surveyed the states in the summer of 1987, and with examination of regulations and telephone calls to state officials by State of the States staff.

Groundwater Matrix

	1	2	3	4	5	6
Alabama			ND		X	
Alaska	X		ND		X	X
Arizona	X		3	X	X	
Arkansas			1			
California	X	X	57*	X	X	
Colorado			ND		X	X
Connecticut	X	X	2	X	X	X
Delaware	X	X	1		X	X
Florida	X	X	4	X	X	X
Georgia	X		1	X	X	X
Hawaii	X	D	5	X	X	X
Idaho	X	+	ND		X	
Illinois			ND		X	
Indiana			ND			
Iowa	X	X	6		X	X
Kansas	X	X	2		X	
Kentucky	X					
Louisiana	X				X	
Maine	X	X	1		X	
Maryland	*	*	5		X	
Massachusetts	X	X	2	X	X	X
Michigan	X			ND	X	X
Minnesota	X		ND		X	X
Mississippi	X	X	4			
Missouri	X	X	1		X	
Montana	X	X	5		X	
Nebraska	D		2		X	
Nevada			ND			
New Hampshire	X		ND			
New Jersey	X	X	1		X	
New Mexico	X		ND		X	
New York	X	D	10		X	
North Carolina	X		1			
North Dakota	X	X	ND		X	
Ohio	X		ND			
Oklahoma	X		ND			
Oregon	X		2	X	X	
Pennsylvania	X		5		X	
Rhode Island	X	X	2		X	
South Carolina	X		2	X	X	
South Dakota	X	X	10		X	
Tennessee	X		ND		X	
Texas	X		1		X	
Utah		+	ND		suspec	
Vermont	X	X	X		X	
Virginia	X	edb	3	X	X	
Washington	X	X	3	X	X	
West Virginia	X	*	2		X	
Wisconsin	X	X	3		X	
Wyoming			ND			

Groundwater Matrix Notes

Column 1 - Monitoring for pesticides.

Column 2 - Pesticide contamination control programs.

Column 3 - Number of pesticides showing up in groundwater monitoring. apparently from normal land application.

Column 4 - EDB found.

Column 5 - Agricultural chemicals reported as a contamination source.

Column 6 - Agricultural chemicals ranked as top 5 in seriousness.

Key:

* = program being developed
+ = labeling program
57* = refers to study being done in California
ND = No data available

Source: "The Leaching Fields: A Nonpoint Threat to Groundwater" a report by the California Assemply Office of Research, March 1985, p. 3 of Executive Summary. The remaining information is from EPA's Water Quality Inventory Report to Congress, 1984, and EPA's State Program Briefs: Pesticides in Groundwater, 1986."

Food Matrix

	1	2	3	4
Alabama			N	Ag
Alaska	N		Y	Env
Arizona			Y	H&Ag
Arkansas			ND	H
California			Y	H&Ag
Colorado			Y	H
Connecticut			N	consumer pro
Delaware	N		Y	
Florida			Y	Ag
Georgia	N		ND	–
Hawaii			Y	H
Idaho	N		Y	H
Illinois			Y	H
Indiana			Y	Ag
Iowa			Y	Ag
Kansas			ND	H
Kentucky			Y	Human Res
Louisiana			Y	H
Maine			N	Ag
Maryland			Y	H
Massachusetts			N	H
Michigan			N	Ag
Minnesota			N	Ag
Mississippi	N		N	H
Missouri			N	H
Montana			Y	H
Nebraska			ND	Ag
Nevada			N	H
New Hampshire			N	H
New Jersey	N		ND	–
New Mexico	N		ND	Ag
New York			Y	Ag&Markets
North Carolina			N	Ag
North Dakota			N	State Lab
Ohio			ND	Ag
Oklahoma	N		N	Ag
Oregon			ND	Ag
Pennsylvania	N		N	–
Rhode Island			Y	H
South Carolina			Y	Ag
South Dakota	N	N	ND	–
Tennessee			N	Ag
Texas			Y	H
Utah			Y	Ag
Vermont			Y	H
Virginia			ND	Ag
Washington			Y	Ag
West Virginia			ND	H&Ag
Wisconsin			Y	Ag
Wyoming	N	N	Y	–

Food Matrix Notes

Column 1 - whether the state has the authority to test for pesticide residues in food.

Column 2 - Authority to seize food tainted with pesticide residues in excess of standards.

(The first two columns have N for no, a blank space means the state has the authority).

Column 3 - Explains whether the states automatically adopt FDA provisions. This adoption process varies from state to state; some states adopt only certain aspects of the federal changes.

Column 4 - State agency testing the food.

Information is from "State Law Data, 1986" prepared by the State Services Branch, Division of Federal-State Relations, Office of Regulatory Affairs, Food and Drug Administration.

Exemptions and Bans Matrix

	1	2	3	4	5	6	7	8
Alabama	2							carbofuran
Alaska								
Arizona	4	1						
Arkansas	6		2					
California	35	3	3	EDB+	2			Cycloheximide, metasystoxR
Colorado	6							
Connecticut			1	cadmium				Daminozide
Delaware	3		3		2			
Florida	11	4			2		2	
Georgia	2	2	2					
Hawaii				Chlordane, TBT				
Idaho	8							
Illinois	3		1					
Indiana	1							
Iowa	1	1						
Kansas	1							
Kentucky	1							
Louisiana		7	1					
Maine	1				2			
Maryland					2			
Massachusetts	5	1		Chlordane/Alachl			2	Daminozide+
Michigan	5	1	2					
Minnesota	5	1		Chlordane				
Mississippi	4		2					
Missouri	3							
Montana	4							aquatic herbicides
Nebraska	2		1					
Nevada	1							
New Hampshire				Chlordane			3	Avitrol, others
New Jersey	4		3					
New Mexico	1		1					
New York	7		1	Chlordane			2	Daminozide
North Carolina	2	1						
North Dakota	4	1						
Ohio	5		1					
Oklahoma	1		1					
Oregon	16	1	3		2	3		
Pennsylvania	2		2					
Rhode Island	1			Chlordane				Daminozide
South Carolina	2							
South Dakota	2							
Tennessee								
Texas	6	5	1	EDB				
Utah								
Vermont			1	TBT				Simazine +
Virginia	5		4		2			
Washington	11	1	1		2			
West Virginia	1		2					picloram, Tordon 10-K(2)
Wisconsin	8	1	3	Difocol			2	
Wyoming	1							

Exemptions and Bans Matrix Notes

State exemption information is from EPA's registration devision "Section 18 actions, Oct. 1, 1986 to Sept. 30, 1987." These are situations in which states have asked EPA for permission to allow a pesticide user to use the product in situations or manners prohibited by the label.

Column 1 - Issue = Number of special exemptions issued by the agency

Column 2 - Crisis = Number of situations in which the state has declared a crisis and allows the unpermitted use while an exemption is being applied for.

Column 3 - Denial = represents the number of denials the agency issued.

Column 4 - Bans = pesticides banned by a state.

The other columns refer to restrictive actions within the last four years taken by the state toward a particular pesticide regardless of whether EPA took similiar action later. 2=detailed restriction such as permission from state before applying. 3=more general restriction, such as special recordkeeping.

Column 5 - TBT

Column 6 - Chlordane

Column 7 - Aldicarb

Column 8 - Other chemicals restricted

Information was gathered through phone calls by State of the States staff to state pesticide registration officials in late 1987.

Enforcement Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Alabama	0	0	1	0	0	0	34	16	0	25	487	76	15.6	0
Alaska	0	0	0	0	0	0	17	0	0	0	28	17	60.7	0
Arizona	5	0	0	0	0	0	29	3	0	0	247	37	14.9	5
Arkansas	0	1	0	0	0	0	7	5	0	1	319	14	4.3	3
California	0	0	0	0	0	0	34	1	0	1	201	36	17.9	0
Colorado	0	0	0	2	0	0	3	0	0	0	126	5	3.9	0
Connecticut	0	0	1	1	0	0	94	0	0	0	156	96	61.5	0
Delaware	0	0	0	0	0	0	6	29	0	18	154	53	34.4	0
Florida	8	0	0	0	0	0	126	41	50	1	846	226	26.7	15
Georgia	0	0	14	0	0	0	48	7	3	50	1219	122	10	6
Hawaii	19	0	1	0	0	0	84	25	0	0	654	129	19.7	16
Idaho	0	0	0	2	0	1	28	11	7	3	69	52	75.3	0
Illinois	1	0	5	2	1	0	59	75	4	2	400	149	37.2	0
Indiana	0	0	1	0	0	0	3	195	4	3	229	206	89.9	0
Iowa	0	1	2	1	0	3	88	46	0	0	404	141	34.9	0
Kansas	0	3	0	0	0	0	35	5	27	0	227	70	30.8	0
Kentucky	0	0	0	0	0	0	72	2	3	77	2298	154	6.7	0
Louisiana	43	0	2	1	0	1	20	45	1	0	292	113	38.6	45
Maine	3	0	0	0	0	0	17	8	0	0	72	28	38.8	0
Maryland	0	0	1	3	4	0	19	50	0	4	585	81	14.5	0
Massachusetts	0	0	1	0	0	0	17	0	0	8	106	26	24.5	0
Michigan	0	4	3	0	0	0	27	0	1	0	256	35	13.6	
Minnesota	0	8	0	0	0	0	35	0	1	6	274	50	18.2	0
Mississippi	0	0	5	0	0	1	21	4	0	29	451	60	13.3	0
Missouri	0	0	3	0	0	0	13	155	35	74	602	280	46.5	1
Montana	1	0	0	1	0	0	11	0	1	3	129	17	13.1	0
Nebraska	n/a													
Nevada	0	0	0	0	0	0	14	3	0	0	98	17	17.3	0
New Hampshire	1	1	5	0	1	3	18	48	1	2	136	80	58.8	12
New Jersey	33	0	0	0	0	0	121	9	0	0	190	163	85.7	33
New Mexico	0	0	1	0	0	1	23	0	0	0	216	25	11.5	0
New York	6	1	0	0	0	0	9	61	0	0	386	77	19.9	7
North Carolina	0	0	6	2	0	0	9	5	8	65	492	95	19.3	6
North Dakota	0	0	0	0	0	0	5	0	0	0	66	5	7.5	0
Ohio	0	0	0	0	0	0	99	2	0	4	432	105	24.3	0
Oklahoma	3	6	1	0	0	0	74	13	0	20	363	117	32.2	7
Oregon	0	2	0	0	0	0	21	0	16	0	71	39	54.4	0
Pennsylvania	6	0	0	0	0	0	59	0	2	0	310	67	21.6	5
Rhode Island	0	0	0	0	0	0	2	0	1	0	61	3	4.9	0
South Carolina	7	0	0	0	0	0	10	10	0	0	409	27	6.6	3
South Dakota	0	10	4	0	0	0	42	1	1	1	466	59	12.6	3
Tennessee	0	5	0	0	0	0	147	6	56	9	543	223	41	0
Texas	6	25	10	12	3	5	70	0	0	0	229	131	57.2	33
Utah	0	0	0	0	0	0	92	16	0	0	1355	108	7.9	0
Vermont	0	0	2	2	1	1	3	6	0	1	55	16	29	0
Virginia	1	2	3	0	2	0	28	51	0	3	430	90	20.9	0
Washington	0	0	0	0	0	0	0	0	0	0	97	0	0	0
West Virginia	0	2	0	0	0	0	9	0	0	2	139	13	9.3	0
Wisconsin	18	0	0	1	0	0	50	17	1	0	95	87	91.5	10
Wyoming	n/a													

Enforcement Matrix Notes

FIFRA compliance figures for both agricultural and non-agricultural pesticides from 10/1/86 to 3/31/87. They performed inspections and took action as follows:

Column 1 - Civil actions

Column 2 - Criminal actions

Column 3 - Administrative hearings

Column 4 - License/certification suspensions

Column 5 - License/certification revocations

Column 6 - License/certification conditions or modifications

Column 7 - Warning letters

Column 8 - Stop sale orders

Column 9 - Seizure or similar actions

Column 10 - Cases forwarded to EPA

Column 11 - Total number of inspections

Column 12 - Total number of actionable inspections

Column 13 - Percentage of inspections resulting in action

Column 14 - Number of cases of assessed fines

Drift Matrix

	1	2	3	4	5	6	7	8	9	10	11
Alabama	X	X	X	X	X	X					
Alaska	X	X							X		
Arizona	X	X	X	X	X	X	X			1	
Arkansas	X	X	X	X	X	X	X	AB		2	X
California	X	X	X	X	X	X	X	AL	X	1	
Colorado	X	X		X	X	X				1	
Connecticut	X	X			X	X	X		X		
Delaware	X	X	X	X	X	X				2	
Florida	X			X	X			AL		1	
Georgia	X	X	X	X	X	X				2	
Hawaii	X				X	X		AP	X		
Idaho	X					X	X			2	
Illinois		X			X	X					
Indiana	X	X	X	X							
Iowa	X	X								2	
Kansas				X	X					2	
Kentucky	X	X	X	X	X	X	X			2	
Louisiana	X	X		X			X	AMP			
Maine	X	X	X	X	X	X	X	AB			
Maryland	X	X			X	X					X
Massachusetts	X	X	X		X	X		AMP		1	
Michigan	X	X	X	X	X					2	
Minnesota	X				X	X				2	
Mississippi	X	X		X						2	
Missouri	X							L		2	
Montana	X	X	X		X	X	X			1	
Nebraska								AP			
Nevada		X		X		X		A			
New Hampshire	X	X		X	X	X	X				
New Jersey	X	X			X		X	AM			
New Mexico	X			X				P	X	2	
New York	X				X	X		A			
North Carolina	X			X	X	X	X	A		1	
North Dakota	X			X	X	X				2	
Ohio	X		X	X			X	AL		1	
Oklahoma	X	X	X	X							
Oregon	X	X				X	X			2	
Pennsylvania	X	X		X						1	
Rhode Island	X				X			A			
South Carolina	X	X	X		X		X				
South Dakota			X	X	X		X			2	
Tennessee											
Texas	X	X	X	X	X	X	X	AB	X	2	
Utah					X						
Vermont	X	X		X	X	X		ABMP		1	
Virginia	X				X	X					
Washington	X	X	X		X	X	X	P	X	2	X
West Virginia	X	X	X		X	X	X	AMB			
Wisconsin	X				X	X		AB			
Wyoming		X	X		X	X					

Pesticide Drift Matrix Notes

Column 1 - Authority to regulate time and manner of application

Column 2 - Financial responsibility

Column 3 - Drift protection specified in applicator insurance requirements

Column 4 - Authority for state to inspect various sites and aspects of application

Column 5 - Drift or off-target organisms mentioned in law

Column 6 - Public health, environment, wildlife specified

Column 7 - Drift boundaries detailed by number of feet or miles

Column 8 - Notice to parties near area being treated
A = advance, B = mail, M = news media, P = posting, L = limited notice to beekeeper only.

Column 9 - Permit required before spraying pesticide

Column 10 - Incident report
1 = Applicator, 2 = Victim

Column 11 - Consideration of IPM methods required

IPM Matrix

	1	2	3	4	5	6
Alabama	220,000	-	275.10	174.70	449.80	N
Alaska	3,000	-	-	-	-	N
Arizona	125,000	393,800	477.80	110.60	588.40	Y
Arkansas	594,578	-	493.70	327.10	820.80	N
California	43,500	112,900	6,460.00	556.30	7,016.30	Y
Colorado	96,000		160.40	118.00	278.40	N
Connecticut	2,000		272.60	111.70	384.30	N
Delaware	4,500	646,700	85.40	26.50	111.90	Y
Florida	-	130,000	2,348.90	352.90	2,701.80	Y
Georgia	696,000	281,300	816.40	169.40	985.80	N
Hawaii	4,220	-	285.20	132.60	417.80	N
Idaho	26,805	-	544.90	76.70	621.60	N
Illinois	18,600,000		363.40	65.90	429.30	N
Indiana	137,034		298.90	52.00	350.90	N
Iowa	21,500	98,900	109.40	110.20	219.60	N
Kansas	76,300	-	267.70	169.00	436.70	N
Kentucky	127,348	-	533.50	181.50	715.00	N
Louisiana	210,000	-	310.70	66.80	377.50	Y
Maine	18,875	-	118.90	88.60	207.50	N
Maryland	24,900	2,005,100	131.50	102.90	234.40	LU
Massachusetts	3,750	-	169.50	173.30	343.20	N
Michigan	20,081	-	320.00	113.50	433.50	*
Minnesota	-		408.60	68.00	476.60	N
Mississippi	5,103,065	846,800	195.10	32.20	227.30	Y
Missouri	13,973	993,300	159.60	288.50	448.10	N
Montana	84,000	78,400	186.40	85.20	271.60	N
Nebraska	51,560	-	109.30	108.20	217.50	N
Nevada	26,000	-	-	-	-	N
New Hampshire	2,750	-	10.40	28.50	38.90	N
New Jersey	15,140	-	149.20	80.20	229.40	N
New Mexico	325,000	-	118.00	42.30	160.30	N
New York	10,350	453,400	782.30	165.60	947.90	N
North Carolina	34,400	-	321.10	87.80	408.90	Y
North Dakota	22,900	125,400	154.80	28.20	183.00	
Ohio	24,000	-	902.30	242.20	1,144.50	N
Oklahoma	309,600		132.60	140.90	273.50	Yscout
Oregon	7,183	-	488.20	61.30	549.50	N
Pennsylvania	180,203	-	149.00	134.10	283.10	N
Rhode Island	3,780	-	13.70	26.30	40.00	N
South Carolina	1,368,000	-	305.50	39.30	344.60	N
South Dakota	1,020,000	-	20.50	28.10	48.60	N
Tennessee	45,061	-	193.90	81.10	275.00	Yclaim
Texas	449,718	636,600	2,308.90	193.30	2,502.20	N
Utah	700	-	56.50	5.80	62.30	N
Vermont	5,600	-	-	3.70	3.70	N
Virginia	88,500	-	385.00	98.30	483.30	N
Washington	-	53,700	301.90	128.30	430.20	N
West Virginia	3,311	-	22.10	49.20	71.30	N
Wisconsin	7,500	-	823.80	136.60	960.40	N
Wyoming	3,030	-	80.80	36.30	117.10	N

IPM Matrix Notes

Refers to Integrated Pest Management, a system that generally reduces chemical pesticide use.

Column 1 - Acreage in USDA Extension programs as reported by state IPM coordinators in 1984.

Column 2 - ARS Research on biocontrol. Note: Stations exist only in these states.

Column 3 - Refers to state money spent on beneficial pathogens, parasites and predators for biological control of pests on agricultural commodities.

Column 4 - Refers to federal funds spent for the same type of research by the Cooperative State Research Service.

Column 5 - Total of Columns 3 & 4.
These 3 columns are from the Current Research Information System database, which is widely held to be unreliable, but was the only source available.

Column 6 - Certification. IPM coordinators were asked if the state certifies IPM consultants in the private sectors.

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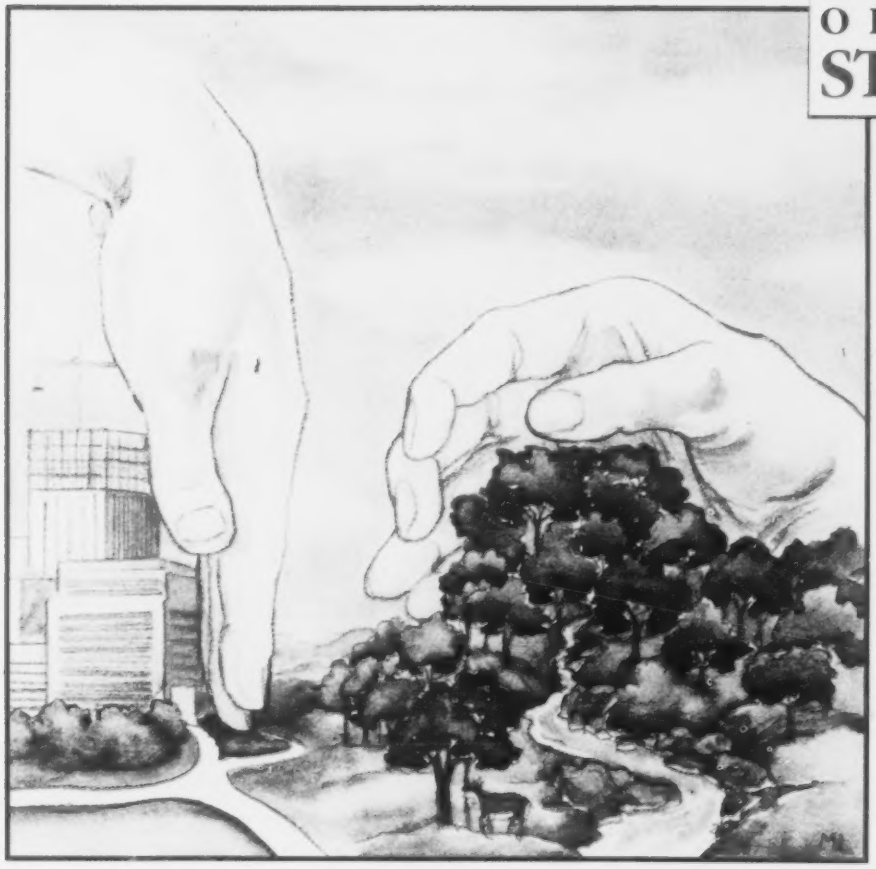
THE STATE OF THE STATES
1988



LAND USE PLANNING

3

FOCUS PAPER

RENEW AMERICA PROJECT

Prepared by:

Nancy Nickell and Scott Ridley
The Renew America Project
May 1988

The Renew America Project is a non-profit, tax-exempt educational organization dedicated to the efficient use of all natural resources. The Project provides individual citizens, state agencies and private organizations with information to assist grassroots change to ensure a clean, safe and livable environment for future generations. For further information on the Renew America Project or to obtain additional copies of this report contact: Renew America, 1001 Connecticut Avenue, N.W., Suite 719, Washington, D.C. 20036, (202) 466-6880. See page 22 for ordering information.

Introduction

The purpose of the Land Use Focus Paper, one of six focus papers designed to supplement the data in the 1988 State of the States report, is to provide more detailed information on the status of land use programs and policies in the fifty states. It provides a national picture of land use planning through maps, matrices, and explanation of key issues, and it offers comparison of the strength of state programs and policies. It is not intended to be a comprehensive assessment of environmental conditions in each state, but an accurate measure of key legislation and programs states have put in place to protect natural resources, the quality of life and public health by managing growth.

State land use plans, the amount of land in state parks and forests and community growth control measures are among the topics examined. Programs to protect wetlands, aquifers, coastal areas, as well as farmland, are also examined, along with "Little NEPA's" modeled after the National Environmental Policy Act. Land use planning is a fundamental tool to prevent pollution of key and critical areas. Because the federal government is shifting greater responsibility for environmental issues to the states , public awareness of state progress, or the comparative lack of it, is critical. For further information, please see the contact list on page 10.

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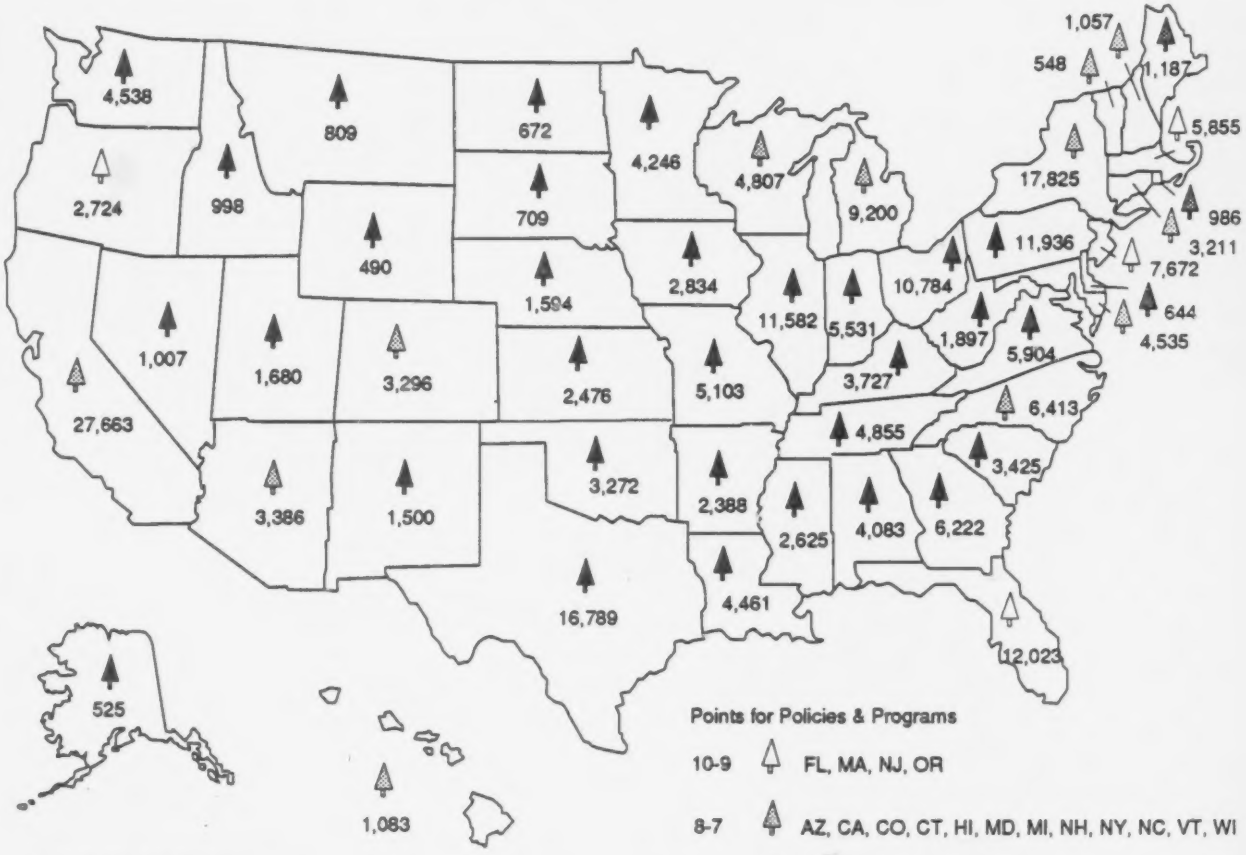
LAND USE PLANNING



Key to reading the map
Example: Oregon - Best Overall
10 points for policies & programs
2,724 Population (in 000's)

Population Source: U.S. Bureau of the Census, 1987
Policies & Programs Source: The Fund for Renewable Energy and the Environment, 1988

Points for Policies & Programs

10-9	FL, MA, NJ, OR
8-7	AZ, CA, CO, CT, HI, MD, MI, NH, NY, NC, VT, WI
6-5	AL, DE, IL, IN, LA, ME, MN, NE, NV, OH, RI, SC, UT, VA, WA
4-3	AR, GA, ID, IA, KS, KY, MS, MO, MT, NM, ND, PA, SD, TN, TX, WV, WY
2-1	AK, OK

Land Use Planning

More than 6,200 new residents arrive in Florida each week, carrying hopes for sun and prosperity and bringing with them all of the problems that come with a steady growth in population. Each day the state needs two new miles of highway, two new classrooms, two more police officers, thousands of gallons of new water supplies, and more tax money for services.1

Most of the new residents settle along the coast, adding fuel to a long debate between developers and environmentalists. During the past few decades, miles of houses, condominiums, and hotels have risen along the beaches, contributing to the destruction of mangrove swamps and the decay of coral reefs and marine life. Inland, highways have sliced through forests to threaten endangered species of wildlife. And all across the peninsula the consumption and contamination of groundwater has become a primary concern.

In Southern California, where boom-and-bust cycles have long been a way of life, debates have kindled over the rates of urban growth. In San Diego, the city council recently voted to cut new housing starts from 15,000 to 8,000. And in Los Angeles voters approved a measure to reduce by one-half the size of buildings on most industrial and commercial property.

The growth debate is often posed as a choice between maintaining economic vitality or general quality of life. But new advocates of growth slowdowns believe that saving coastal or agricultural land, or reducing traffic jams and crowding, preserves economic health of cities and helps keep the cost of services down. Many environmentalists are encouraged by the new concern about growth but fear that planning efforts will be too little, too late, or succeed only in contributing to urban sprawl.

Decisions being made in Florida, Southern California, and rural areas across the country reflect a dilemma that is intensifying as the number of Americans grows by 2.2 million each year— the equivalent of a new Houston or New Orleans. By 2010, the nation's population is expected to reach 283.2 million, an increase of about 44 million over 1985, or the equivalent of adding the population of California and New York.

The demands of providing housing, siting industry, building highways, and providing water to this growing population often clash with the need to protect farmlands, wetlands, coastal areas, or the quality of urban life. Depending on the general environment and land-use patterns of a state or region, the conflicts can vary widely. But a common solution for both managing growth and setting priorities for areas needing protection is land-use planning.

Land Ownership

The United States has a land area of 2.25 billion acres for a population of 243 million people. The federal government owns about 700 million acres, or one third of the nation's land area, most of it in the western states and Alaska. Three-fifths, more than 1.3 billion acres, is privately owned. State and local governments own 155 million acres and Native American lands total 51 million acres.

Of privately owned land, 67 percent is held by individuals and married couples, 16 percent by other family groups (including family corporations), 13 percent by other corporations and partnerships, and 4 percent by miscellaneous deedholders. Distribution of private land title is uneven; 40 percent of privately owned land is in the hands of just 0.5 percent of the landowners; 78 percent of private landowners hold deeds to only 3 percent of the private land.

Ninety million acres of federal land are managed by the Fish & Wildlife Service, and 85 percent of those acres are in Alaska. The Corps of Engineers manages almost 4,000 recreation sites on 10 million land and water acres. The Bureau of Reclamation administers six million acres of land and water, including 355 recreation areas in 17 western states. The Bureau directly manages 49 recreation areas and has cooperative agreements with state and local governments for administration of another 242 reservoir sites.

The Bureau of Indian Affairs (BIA) administers more than 50 million acres of land scattered throughout the U.S. generally concentrated in western states. For many years this land was essentially closed to non-Indian use; however, over the past ten years, these lands have become more accessible. The general public spends 8.5 million recreation days on BIA lands.

States administer 61.8 million acres of state parks and recreation areas, forests, and wildlife areas. These include 5,300 state parks, 721 state forests, and 7,400 wildlife areas, as well as a variety of natural, historic and cultural areas, and reservoir and river recreation sites.

State governments oversee some uses of federal land, but their regulation is largely limited to the remaining two-thirds in public and private ownership. About half the land in the coun-

try is cropland and grazing land. One third is forestland. And the remainder is split between developed land, open swamps, desert, and tundra.

The general trends for changes in land-use are: a decline in farmland, a decline in forestland, and migration into cities and coastal areas. By 1990, 75 percent of the population is expected to live within fifty miles of a coast.[2] The big growth states are: Alaska, Nevada, Arizona, Florida, Texas, California, Utah, New Mexico, Colorado, and Georgia. And those with declining populations are: Iowa, Nebraska, North Dakota, Montana, Idaho, West Virginia, Oklahoma, and Wyoming, according to the Census Bureau.

Growth and migration under the free enterprise system is largely unmanaged. But the impacts and the chaos that can result in depletion of water supplies, or traffic jams, or pollution do need to be managed. Despite negative or positive growth rates, land-use planning provides a public process to set priorities and address everything from roosters in a neighbor's backyard to setting aside tracts in a state plan for industrial development or aquifer protection. States can be grouped into three general categories for how comprehensively they utilize land-use controls and planning.

Zoning

The vast majority of states oversee development through zoning based on laws dating back to the federal Standard State Zoning Enabling Act of 1922 and the Standard City Planning Enabling Act of 1928. With statutes modeled on these federal laws, states give zoning and subdivision powers to local and municipal governments. In many areas, however, even the most common zoning regulations do not exist. Only eight states have greater than 85 percent of their cities and towns utilizing zoning regulations. Another 15 states have between 60 and 84 percent of the cities and towns with zoning laws. In 20 states the figure is 30 to 59 percent. And in five states, 29 percent or less of the cities and towns have enacted zoning laws.

Zoning laws and regulations have traditionally addressed health, morals, and general welfare in communities, and are largely inadequate to resolve many of the complex issues we currently face. But recently more creative uses of zoning have become prevalent. The number of counties and municipalities with agricultural zoning to restrict development and protect prime farmland, for example, increased from 270 in 1981 to 500 in 1986. Local governments in 28 states now have some form of agricultural zoning.[3]

A related concept is a "growth boundary" or "urban limit" designed to separate urban and rural areas. The boundary describes the limit of the full range of urban services such as sewer and water. Some communities have also begun to place upper limits on population, and residential or commercial and industrial development. The decision to limit the number of housing starts in San Diego is a controversial step in this direction. Many of these growth limits will face constitutional challenges.

Zoning is also being used to protect critical areas such as watersheds, steep slopes, and other environmentally sensitive land. But the general shortcoming of county or municipal zoning is that it usually cannot address regional problems.

Regional and Critical Area Planning

In the early 1960s and 1970s, state governments began to develop more comprehensive land-use controls to resolve regional problems. In many cases a few states would initiate a law and the federal government would pass legislation encouraging others to follow suit. Following the lead of the federal National Environmental Policy Act, 20 states have developed some form of "Little NEPA" in an attempt to ensure that state funded projects, such as highways and other major developments, would not have adverse environmental impacts. The state laws generally require an environmental assessment and the filing of an environmental impact statement, along with public hearings to discuss the findings.

Along with their "Little NEPA's," some states also began to identify and protect key or critical areas within a region. Following passage of wetlands protection in the Clean Water Act, all states passed provisions to protect wetlands. But because of lax standards and enforcement and the pressures of development, the nation is still losing half a million acres of wetland habitat each year. Louisiana is reportedly losing $145 million each year in sport and commercial fishing because of the decline in wetlands. And in addition to wildlife habitat, wetlands provide important aquifer recharge areas.[4]

Power plant siting is an issue states have also taken up as a critical regional planning element. In 1980, 15 states had special regulations to oversee the siting of power plants. In 1987, 28 states had such regulations. Industrial development of this type and competition between

communities to develop their tax bases, or protect broad agricultural, forest, or residential areas from other development have encouraged the creation of a number of other controls and incentives.

During the 1970s, plans to protect forests and farmland from development took the form of "purchase of development rights programs." These programs remove speculation pressures by purchasing development rights of targeted lands from owners and allowing them to continue current use of the land. In 1988, 11 states had such programs.

Another common measure is to protect an entire region. In 1972, Congress passed the Coastal Zone Management Act and gave 30 states with shoreline on the Atlantic, Pacific, Gulf of Mexico, and Great Lakes grants totalling $16 million a year to regulate coastal development. Additionally, North Carolina passed a special coastal protection plan in 1974 and California passed a similar law. New Jersey set up a zone to protect its northern Pinelands in 1979.

Statewide Land Use Planning

State involvement in critical land use decisions and growing oversight of local planning decisions on major projects encouraged development of statewide land-use planning. Hawaii, Vermont, Colorado, Florida, Oregon, and New Jersey have initiated efforts at statewide land-use goals.

Hawaii developed the first state-wide plan in 1961. Its land market, culture, and development patterns differed significantly from the rest of the country, however. It established a Land Use Commission empowered to zone the state in four land–use districts and issue special permits or zoning variances. Although it left a fine legacy, the planning law is now considered outdated in terms of statewide planning practices. And in 1984, the Hawaii legislature loosened the potential integrated policy framework by not requiring county plans to be consistent with state plans and guided by them.[5]

A few other states have also passed statewide land-use planning laws, but the compromise they attempt to form between development and environmental needs on a large scale usually encounters considerable controversy. Colorado, for example, passed a statewide land–use planning law, but it has been gutted by elimination of staff and enforcement. And Oregon, which passed its law in 1973, has faced repeated challenges.

Oregon has been noted as the groundbreaker in statewide land-use planning, by establishing goals and a process that seeks consistency among policies at the regional and local levels. The land use plan resulted in 15.5 million acres of productive farmland being placed in exclusive farm zones and 12 million acres of forests being included in the protective policies of local plans. But controversy has surrounded plans to protect rivers and streams from alleged abuses by the timber industry, and a number of counties have delayed submission of their plans to the state.[6]

In Florida, where cities and towns were far behind on efforts to submit plans first called for in 1969, recent legislation has given renewed hope for success and has improved on the Oregon model. In 1985 the Local Government Comprehensive Plan and Land Development Regulation Act required local governments to submit plans containing coastal zone management, traffic circulation, housing, and all essential elements for management by July 1, 1990. Localities that don't comply will have plans prepared by regional agencies and will be billed for the work. One of the most important elements is the opportunity for citizens to challenge a local plan if it is believed to be out of compliance with the state planning requirements.

Florida is also looking at innovative ways to make growth bear its own environmental costs. Nearly half the total state and local costs of implementing the state comprehensive plan relate to transportation. An increase in gasoline taxes of 10 cents a gallon has been recommended to help secure bonds, as well as optional local sales taxes.[7]

Oregon and Florida are recognized as the leaders in state land-use planning, but other states are not expected to resolve differences between competing interests and follow soon. It isn't expected that these model plans will bubble up to the federal level any time soon, either.

Federal Government and New Trends

During the heyday of land-use planning in the early and mid-1970s, there was considerable support for a federal land-use planning law that would have sparked designation of critical areas and regulation of development at the state level. In 1974, a national land-use policy act passed in the Senate and failed by only seven votes in the House.

The trend in the 1980s appears to be focused on greater decision-making on land-use at the local level. In addition to innovative zoning efforts, other concepts such as "development timing" are also emerging. This regulates growth for urban areas by establishing a sequence for

Land Use Planning Main Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13
Alabama	4,083	32,491	4	3	14	48,,326	0.15	c,wt	3				
Alaska	525	365,333	86	nd		2,047,000	0.86	c,wt		2			
Arizona	3,386	72,645	44	2	3	2,560,000	0.22	wt	1	3		X	1, 2, 3, 4
Arkansas	2,388	33,330	10	2	27	18,000	0.95	wt	4			X	
California	27,663	100,031	48	6	19/P	70,398/P	0.75	c,wt	1	1		X	12
Colorado	3,296	66,301	36	2	25	0	0.14	c,wt	2		P		1, 2, 3, 4
Connecticut	3,211	3,118	0	19	8	136,529	0.96	c,wt	1	3		X	1, 2, 3, 4
Delaware	644	1,237	2	11	43	6,386	0.82	c,wt	1				
Florida	12,023	34,658	13	9	11	304,310	0.96	c,wt,wh	2	3	P	X	
Georgia	6,222	37,156	6	5	19	52,000	0.13	wt	3				2
Hawaii	1,083	4,112	20	3	9	661,560	0.60	c,wt		3	P		
Idaho	998	52,744	64	1	33	3,213,150	0.06	wt	3				
Illinois	11,582	35,613	2	5	70	16,557/P	0.30	wt	3			X	
Indiana	5,531	22,996	2	5	61	146,518	0.22	c,wt	2				2
Iowa	2,834	35,818	1	2	74	25,000	0.17	wt	3			X	3
Kansas	2,476	52,338	1	1	56	0	0.07	wt	4			X	
Kentucky	3,727	25,388	5	3	24	44,420	0.16	wt	3	3			
Louisiana	4,461	28,494	4	3	24	8,050	0.05	c,wt	3				1, 2, 3, 4
Maine	1,187	19,837	1	1	5	108,117	1.21	c,wt	3				1, 2, 3, 4
Maryland	4,535	6,296	3	13	29/P	131,841/P	1.32	c,wt	2	1		X	1, 2, 3, 4
Massachusetts	5,855	5,008	2	18	6/P	207,076	2.12	c,wt,wh	1	1		X	1, 2, 3, 4
Michigan	9,200	36,451	10	6	28	3,795,500	0.61	c,wt	2	3		X	1, 2, 3, 4
Minnesota	4,246	50,911	7	2	49	1,940,28/P	0.05	wt	2	1		X	
Mississippi	2,625	30,229	6	2	26	131,803	0.41	c,wt	4				3, 4
Missouri	5,103	44,125	5	3	36	0	0.22	wt	3				
Montana	809	93,048	29	0	26	203,000	0.05	wt	4	1		X	
Nebraska	1,594	49,052	2	1	42	0	0.28	wt	3	3			1, 2, 3, 4
Nevada	1,007	70,332	85	2	9	102,000	0.22	wt	1	3		X	4
New Hampshire	1,057	5,756	13	5	3/P	75,629/P	0.50	c,wt	2			X	
New Jersey	7,672	4,779	3	25	18/P	202,826	1.15	c,wt	1	3	P	X	1, 2
New Mexico	1,500	77,654	33	1	5	0	0.08	wt	3			X	
New York	17,825	30,321	5	6	20/P	840,000/P	4.66	wt	2	1		X	
North Carolina	6,413	31,260	7	6	23/P	1,069	0.30	c,wt	2	1			1, 2, 3, 4
North Dakota	672	44,352	5	1	54	12,725	0.03		2			X	
Ohio	10,784	26,243	1	8	48	168,604	0.69	wt	3			X	
Oklahoma	3,272	43,939	4	2	27	0	0.16		4				
Oregon	2,724	61,558	50	2	15	80,000/P	0.14	c,wt	2		P	X	
Pennsylvania	11,936	28,728	2	7	21/P	1,872,090	0.98	c,wt	3				
Rhode Island	986	675	1	21	4/P	30,000	1.48	c,wt	1	3			
South Carolina	3,425	19,330	6	5	20	45,000	0.36	c,wt	3			X	
South Dakota	709	48,609	7	1	37	0	0.19	wt	3	1		X	
Tennessee	4,855	26,339	7	4	22	150,303	0.33	wt	3				
Texas	16,789	167,691	2	3	20	7,147	0.09	c,wt	3	3			
Utah	1,680	52,527	64	2	12	0	0.15	wt	3	3			
Vermont	548	5,935	5	2	12/P	0	2.67	wt	2			X	1, 2, 3, 4
Virginia	5,904	25,410	10	5	15	53,159	0.27	c,wt	2	1		X	
Washington	4,538	42,567	29	3	26/P	3,400	0.38	c,wt	2	1		X	4
West Virginia	1,897	15,436	8	2	8	69,861	0.43	wt	3				
Wisconsin	4,807	34,833	5	3	35	427,550	0.34	c, wt	2	1		X	1, 2, 3, 4
Wyoming	490	62,073	50	1	8	0	0.09		3			X	

construction of public facilities, issuance of building permits, and development plans. California's cities are also expected to have set a precedent for going to voters with planning issues.

On a broader scale, the federal government is taking a piecemeal approach at preserving key or critical areas. The federal Conservation Reserve program offers farmers incentives to preserve fragile cropland by taking it out of production. Several states have followed suit with their own conservation reserve programs. Protection of groundwater and aquifers is also being stimulated by federal and state concern over contamination of groundwater.

As public concerns over air pollution, toxic waste, solid waste, groundwater, farmland and urban development continue to grow, calls for stronger and more integrated state regulation is inevitable. Timing, foresight, and a willingness to compromise will be essential. Policymakers in each state and locality will need to decide on whether land-use planning will be crisis management or management to avoid or minimize crises.

Matrix Key

1. State Population: 1987 U.S. Census Bureau figures.

2. Total Land Acreage: USDA most recent statistics (1982).

3. Percentage of Federally-Owned Land: Conservation Foundation figures (1987).

4. Percentage of Urban Land: percentage of land that is urban and built-up (Ibid. 1987).

5. Cropland: percentage of non-federal land used for crops. "P" —state has developed a purchase of development rights program (PDR).

6. Acreage in State Forests: 1986 estimates from National Association of State Outdoor Recreation Liasion Officers; "P"— state has passed a forest planning act.

7. Percentage of Land in State Parks: 1986 estimates, Ibid.

8. Key or Critical Areas: specific state provisions for protection of: coastal areas "c", wetlands "wt" and wellheads "wh."

9. Proportion of Communities Having Zoning: "1"—85% or more, "2"—60–84%, "3" 59–30%, "4"—29% or fewer.

10. Little NEPAs: "1"--has law very similar to the federal one, "2"-- an EIS process, "3"--EIS on a more limited basis.

11. State Land-Use Plan: "P"—state has passed legislation for development of a statewide land-use plan (varying levels of implementation not noted on matrix but taken into account in ranking).

12. Power Plant Siting: "X"—state oversees siting of power plants.

13. Hazardous Waste Facility Siting. State oversees siting of hazardous waste facilities; "1" - examines surface water impacts, "2" - examines groundwater impacts, "3" - examines geology, "4" - conducts physical/chemical studies of site.

Land Use Matrix

State Population in Thousands: U. S. Bureau of the Census, December 30, 1987 estimate.

Total Land Acreage in Thousands: Agricultural Statistics 1985, USDA (1982 figures).

Percentage of Federally-Owned Land Land: State by State Environmental Summaries, A Supplement to: State of the Environment: A View Toward the Nineties, by the Conservation Foundation, October, 1987.

Percent of Land That is Non-Federal Cropland: Ibid. and PDR designation is from Nancy Bushwick, Director, the Farmland Project of the National Association of State Departments of Agriculture.

Acreage in State Forests: National Association of State Outdoor Recreation Liaison Officers, January 1986 estimates. State forest plan information is based upon staff interviews with USDA Forest Service officials.

Percentage of Land in State Parks: National Association of State Outdoor Recreation Liaison Officers, January 1986 estimates.

Key or Critical Area Protection: Wetlands information is from State by State Supplement to State of the Environment : A View Toward the Nineties, wellhead protection information is from Ron Hoffer, U.S. EPA Office of Groundwater Protection.

Proportion of Communities Using Zoning Regs: Thomas Rudel, "The Human Ecology of Rural Land-Use Planning," Rural Sociology, Winter, 1984 Vol 49, p. 491-504.

Little NEPA: Staff interview with Nicholas A. Robinson, Director, Center for Environmental Legal Studies, Pace University Law School, January 1988.

Statewide Land Use Plan: Staff interview with John M. DeGrove, Director, Florida Atlantic University/ Florida International University Joint Center for Environmental and Urban Problems, January, 1988.

Power Plant Siting: "Summary of State Statutes Related to Power Plant Siting and Environmental Protection" from the Annual Report on Utility and Carrier Regulation by the National Association of Regulatory Utility Commissioners, 1986.

The Final Scores

	Land Use Planning Points	Total Points	Overall Ranking
Massachusetts	9	45	1
Wisconsin	7	45	
California	8	44	3
New Jersey	9	44	
Connecticut	8	43	5
New York	8	42	6
Oregon	***10**	**42**	
Florida	9	41	8
North Carolina	8	40	9
Hawaii	7	38	10
Michigan	7	38	
Minnesota	5	38	
New Hampshire	7	38	
Rhode Island	6	37	14
Maine	6	36	15
Vermont	8	36	
Maryland	8	35	17
Iowa	3	34	18
Virginia	5	34	
Delaware	6	32	20
Washington	6	32	
Nebraska	6	31	22
Pennsylvania	4	31	
Ohio	6	30	24
Colorado	7	29	25
Illinois	5	29	
Montana	4	29	
Utah	6	29	
Indiana	6	28	29
Georgia	4	27	30
South Dakota	4	27	
North Dakota	4	26	32
West Virginia	3	26	
Arizona	7	25	34
Idaho	3	25	
Kansas	3	25	
South Carolina	5	24	37
Kentucky	3	23	38
Missouri	3	23	
New Mexico	4	22	40
Alabama	5	21	41
Alaska	2	21	
Louisiana	6	20	43
Tennessee	3	20	
Nevada	5	19	45
Oklahoma	1	19	
Texas	3	19	
Arkansas	3	17	48
Mississippi	4	17	
Wyoming	3	15	50

Key:

Land Use Planning Points are based on a scale of 1 to 10. The points were derived from the data in the matrices. See "Ranking Notes" on page 9 for detailed explanation.

Total Points consist of a maximum score of 60 points. Each of the six topics in the 1988 report have a maximum value of 10 points. (The six topics are: Highway Safety, Indoor Pollution, Surface Water Protection, Reducing Pesticide Contamination, Land Use Planning, and Energy Pollution Control.) The point values for each topic are added together to give the state's total point score.

Overall Ranking is the ranking of the states based on the total points received for all six topics. In the case of a tie each state is given the same ranking. Example: Both Massachusetts and Wisconsin received 45 total points and therefore are tied for first place.

Summary Example: With 34 points, Virginia ranks 18th in the nation in overall environmental quality. For Land Use Planning, Virginia received five points on a 10 point scale. The five points received were added together for with the points for the remaining five topics to equal the total point score of 34.

* **Oregon** was judged best for Land Use Planning with a maximum score of 10.

Land Use Snapshot

Oregon was the first state to attempt establishment of state wide land-use planning goals and policies. A state wide land-use planning law passed in 1973 has provided an integrated framework for local planning. The Land Conservation and Development Commission is responsible for the state plan and is also empowered to review local plans for compliance with state goals. All state agencies are also required to adopt plans consistent with state goals.

The goals include establishment of urban growth boundaries, housing targets, protection of farmland and forestland, and water ways. The plan has resulted in more than 15 million acres of farmland being placed in exclusive farm–use zones and 12 million acres of forests being included in protective policies of local plans. Plans to protect rivers have reportedly run into opposition from the timber industry.

In addition to the statewide planning process, Oregon also has programs to protect key and critical areas such as coastal areas and wetlands and a plan for state forests. The state also oversees siting of power plants, but lacks defined policies for the siting of hazardous waste facilities. Sixty to 84 percent of the cities and towns in the state utilize zoning regulations.

Despite shortcomings and controversy over the statewide plan, it represents the best state land-use planning policies in place.

Currently:

- Eight states have greater than 85 percent of their municipalities utilizing zoning regulations;
- 15 states have between 60 and 84 percent using zoning regulations;
- 20 states have between 30 to 59 percent using zoning regulations;
- five states have 29 percent or less of their municipalities using zoning regulations;
- 24 states have enacted policies similar to the National Environmental Policy Act requiring environmental impact statements;
- 28 states have special regulations to oversee power plant siting;
- 12 states have comprehensive regulations to oversee hazardous waste facility siting;
- five states have passed state wide land–use planning legislation.

Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, extent of funding, monitoring, enforcement, and indications of progress. Although programs mandated by state legislatures, rather than innovative projects, receive greater weight, attention is given to assure that states have not simply "papered over" a problem with new legislation.

The evaluation is both comparative and subjective and is not intended to represent an absolute scale in which the top state is doing everything possible to protect the environment on a given topic. Research material and data on which the rankings are based are drawn from a variety of sources: individual telephone and mail surveys of the states; information filed by the states with federal agencies; studies and surveys conducted by academic institutions, private contractors, and national environmental organizations; and information from reviewers regarded as experts in their field. In each case, we have utilized what we believe to be the best data available.

Ranking for land-use planning was based on a number of factors for managing growth and protecting key and critical areas. Primary consideration was given to four topics: the use of zoning regulations by cities and towns at four levels noted on the Matrix Key; the use of zoning and state regulation to protect critical area such as wetlands, coastal areas, or wellheads; state provisions for siting of power plants; and special regional plans for forests or coastal zones. In addition, weight was given to states that have integrated their goals and planning through development of statewide land use plans. Also considered was state approval of the use of purchase of development rights to protect targeted lands. "Little NEPAs" — state versions of the National Environmental Policy Act — were noted in the matrix but not given weight in the rankings because of wide disagreement over what constitutes a state NEPA.

States without significant development pressure and few land use policies were generally in the middle of the scale, except if they lacked even the few applicable measures to protect land and resources. Also, it was considered desirable for all states to establish long term planning goals to protect key areas, resources, and quality of life.

Contacts

Robert J. Gray
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Population-Environment Balance, Inc.
1325 G Street, N.W., Suite 1003
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(202) 879-3000

Balance is in the process of opening up a growth management clearinghouse with a toll-free telephone number to assist citizens and governments handling growth problems. Target date for the clearinghouse opening is mid-May, 1988.

The American Planning Association
Headquarters:
176 Massachusetts Ave., N.W.
Washington, D.C. 20036
(202) 872-0611
Planners Bookstore
1313 E. 60th Street
Chicago, IL 60637
(312) 955-9100

The American Planning Association publishes periodicals, books and other material on land use planning.

John M. DeGrove, Director
Joint Center for Environmental and Urban Problems
Florida Atlantic University/ Florida International University
220 Southeast Second Ave.
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(305) 355-5255

The center publishes Florida Environmental and Urban Issues, examining that state's new land use planning system in detail.

Nicholas A. Robinson
Director
Center for Environmental Legal Studies
Pace University Law School
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Professor Robinson is preparing a summary of papers on state NEPAs from a conference held by the Council on Environmental Quality in 1987.

Frank J. Popper
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Urban Studies Department
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Dr. Popper has written extensively on urban planning.

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National Association of State Departments of Agriculture
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The Farmland Project publishes Farmland Notes, a monthly newsletter about state and local programs to preserve farmland.

Lori Williams A-104-F
U.S. EPA Office of Wetlands Protection
401 M Street, S.W.
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(202) 382-5084
This office has done a major study of state wetland protection programs.

Ron Hoffer WH-550-G
U.S. EPA Office of Ground-Water Protection
401 M Street, S.W.
Washington, D.C. 20460
(202) 382-7077

This office has prepared books on guidance of state wellhead protection program funds under the Safe Drinking Water Act. The funds, however, have not yet been authorized by Congress.

Edward T. McMahon
Coalition for Scenic Beauty
218 D Street, S.E.
Washington, D.C. 20003
(202) 546-1100

The Coalition is working for stricter regulation of billboards, the installation of which causes tree-cutting and other environmental and aesthetic problems.

Land Use Planning Text Notes

1. State Comprehensive Plan Committee, quoted by Rep. Bud Gardner in "Florida's New Sales Tax Law," Florida Environmental and Urban Issues, Oct. 1987 p. 2.

2. The prediction of 75 percent of the population living within 50 miles of a coast is from Eugene T. Ruane, of Population-Environment Balance, personal communication, Nov. 23, 1987. The rises and declines in state population are from a U.S. Bureau of the Census press release: "Florida Now Fourth Largest State, Census Bureau Reports," Dec. 30, 1987.

3. "The Human Ecology of Rural Land Use Planning," by Thomas Rudel, Rural Sociology, Winter, 1984 p. 494.

4. *The Report of the President's Commision on Americans Outdoors: The Legacy, The Challenge*, Island Press, 1987 p. p. 23.

5. "State Land Planning and Regulation: Innovative Roles in the 1980's and Beyond," by John M. DeGrove and Nancy E. Stroud, Land Use Law, March, 1987 p. 5.

6. Ibid, pp. 5-6, and "Running Out of Tomorrows," by Robert E. Stacey, Jr., in *Running Out of Tomorrows, Landmark*, the 10th Anniversary edition (1985) of the quarterly journal, published by 1,000 Friends of Oregon.

7. Personal communication, James Murley, president of 1,000 Friends of Florida., December 6, 1987.

Bibliography

Community Responses to Population Growth and Environmental Stress: A National Inventory of Local Growth Management Strategies by Eugene T. Ruane and Robert J. Gray, Population-Environment Balance, Inc., Washington, D.C., July 1987. (Note: previously unpublished data gathered for the Balance study is contained in the growth matrix of this report.)

Treatise on Environmental Law Vol. 2 by Frank P. Grad, Matthew Bender & Co., New York, NY.

The Report of the President's Commission on Americans Outdoors: The Legacy, the Challenge, Island Press, Washington, D.C., 1987. (Note: previously unpublished data gathered by the commission is contained in the parks matrix of this report).

State of the Environment: A View Toward the Nineties, along with the supplemental State-by-State Environmental Data Summaries. The Conservation Foundation, Washington, D.C., 1987.

"Understanding American Land Use Regulation Since 1970: A Revisionist Interpretation," by Frank J. Popper, to be published in the Journal of the American Planning Association, Summer, 1988.

"Running out of Tomorrows," the 10th Anniversary edition of Landmark, quarterly journal of 1,000 Friends of Oregon, Portland, Oregon, 1985.

"SEQURA's Siblings: Precedents from Little NEPA's in the Sister States" by Nicholas A. Robinson, Albany Law Review, Summer 1982.

"State Land Use Planning and Regulation: Innovative Roles in the 1980's and Beyond," by John M. DeGrove and Nancy E. Stroud, Land Use Law, March, 1987.

Parks Matrix

	1	2	3	4	5	6	7	8	9	10	11
Alabama	56	579,586	15	48,326	29	640,972	149	-	10	212	1,008,996
Alaska	101	3,131,756	2	2,047,000	23	1,969,704	612	50	8	571	314,504,989
Arizona	19	36,107	-	2,560,000	54	84,903	30	-	492	2,347	28,705,966
Arkansas	295	340,190	1	18,000	140	270,083	168	405	15	1,460	3,372,595
California	175	749,974	8	70,398	14	118,486	1,550	1,282	58	11,848	43,392,043
Colorado	-	159,429	-	-	-	587,191	-	-	-		23,700,753
Connecticut	-	29,695	-	136,529	-	19,360	-	-	-		12,434
Delaware	12	10,156	4	6,386	54	34,397	0	0	18	50	38,529
Florida	446	330,618	4	304,310	109	2,479,217	1,878	47	25	834	3,794,818
Georgia	195	75,912	3	52,000	68	1,047,886	550	15	14	8,500	1,748,742
Hawaii	68	24,736	-	661,560	72	83,249	674	-	15	478	512,451
Idaho	27	30,640	-	3,213,150	-	103,300	120	-	2	35	32,959,990
Illinois	77	105,480	4	16,557	96	213,306	0	0	33	536	622,781
Indiana	27	165,336	15	146,518	236	126,907	2,099	108	17	944	323,334
Iowa	145	60,837	8	25,000	463	129,285	-	25	6	41	255,080
Kansas	52	37,931	0	0	104	398,195	0	0	18	818	598,499
Kentucky	-	42,000	7	44,420	23	52,000	-	80	-	-	1,278,283
Louisiana	13	13,399	1	8,050	42	1,050,000	120	1,290	23	1,697	1,067,452
Maine	75	239,300	12	108,117	41	45,259	1,222	92	25	576	138,316
Maryland	44	83,116	12	131,841	54	82,532	1,200	0	32	1,780	75,124
Massachusetts	113	245,774	80	207,076	51	49,000	129	24	10	982	63,601
Michigan	89	222,600	8	3,795,500	63	264,400	950	1,240	2	-	3,512,514
Minnesota	64	34,608	55	1,940,285	1,248	490,298	2,236	2,500	126	7,788	3,501,675
Mississippi	109	124,272	-	131,803	56	774,487	155	-	44	5,329	1,741,817
Missouri	27	98,208	0	0	514	452,363	632	0	47	1,866	2,129,296
Montana	335	50,900	7	203,000	264	280,700	-	600	-	-	27,979,875
Nebraska	91	142,591	0	0	180	97,085	0	400	308	3,445	601,051
Nevada	29	224,144	8	102,000	-	-	49	-	5	2,495	56,492,121
New Hampshire	58	28,550	108	75,629	86	10,533	27	-	9	100	735,117
New Jersey	41	63,090	11	202,826	70	166,606	140	14	24	51	83,815
New Mexico	42	140,832	-	-	31	140,000	60	15	-	-	23,082,807
New York	-	1,464,658	-	840,000	-	177,000	1,239	1,230	-	2,607	85,737
North Carolina	126	452,184	5	1,069	233	2,017,814	246	88	23	2,142	1,988,608
North Dakota	24	450,000	16	12,725	151	139,693	280	-	57	2,069	3,096,305
Ohio	71	187,132	20	168,604	111	154,834	1,240	626	59	4,673	316,852
Oklahoma	66	77,548	-	-	48	72,359	150	-	32	1,194	1,469,709
Oregon	229	508,995	-	80,000	-	-	2,707	851	-	-	32,266,517
Pennsylvania	166	305,660	86	1,872,090	541	-	12,709	271	55	2,786	665,295
Rhode Island	183	10,000	12	30,000	12	9,000	107	-	13	26	1,345
South Carolina	45	240,502	9	45,000	79	441,048	358	0	6	571	947,910
South Dakota	75	91,803	-	-	523	147,786	334	-	1	45	3,525,870
Tennessee	31	87,492	13	150,303	24	166,800	504	316	31	11,500	1,781,508
Texas	92	157,716	4	7,147	32	345,984	275	0	35	7,510	3,055,890
Utah	22	84,893	-	-	-	-	-	-	7	1,649	32,602,472
Vermont	46	158,754	-	-	238	90,050	280	-	19	3,400	342,136
Virginia	380	186,728	11	53,159	153	165,023	348	385	121	-	2,168,454
Washington	170	165,000	147	3,400	466	811,000	900	67	-	-	44,362,608
West Virginia	28	67,651	9	69,861	102	213,034	-	-	278	-	1,122,681
Wisconsin	77	119,219	18	427,550	476	506,064	2,078	105	-	-	1,835,228
Wyoming	12	57,776	-	-	87	281,410	8	-	18	1,197	30,704,825

Parks Matrix Notes

Column 1 - Number of state park areas

Column 2 - Number of acres in state parks

Column 3 - Number of state forest areas

Column 4 - Number of acres in state forests

Column 5 - Number of fish and wildlife areas

Column 6 - Number of acres in fish and wildlife areas

Column 7 - Number of trail miles

Column 8 - Number of protected river miles

Column 9 - Number of area of historic and cultural interest

Column 10 - Number of acres of historic and cultural interest

Column 11 - Number of acres in miscellaneous federal recreation areas

State Parks & Forests data from January 1986 estimates by the National Association of State Outdoor Recreation Liason Officers, based on Statewide Outdoor Recreation Plans.

The figures for federal lands available for recreation were added up from a chart prepared for the President's Commission on Americans Outdoors. Figures from the Bureau of Land Management, Public Land Statistics - 1985, GPO, Washington, D.C. U.S. Forest Service - Compilation as of 9/30/86, Forest Service, USDA, Washington, D.C. Fish & Wildlife Serivce, compilation as of 9/30/86, F&WS, U.S. Department of the Interior, Washington, D.C., National Park Service, Compilation as of 9/30/86, U.S. Department of the Interior, Washington, D.C., Corps of Engineers, Bureau of Reclamation and Tennessee Valley Authority, Public Land Statistics, 1984, GPO, Washington, D.C.

Farmland Matrix

	1	2	3	4	5
Alabama		X			10,200
Alaska		X	X		0
Arizona	X				2,600
Arkansas	X				6,000
California			X	P	11,750
Colorado	X				3,253
Connecticut		X			2,726
Delaware		X			1,605
Florida	X				29,875
Georgia		X			8,423
Hawaii			X		0
Idaho	X				627
Illinois	X				20,943
Indiana	X				13,583
Iowa	X				15,956
Kansas	-	-	-		7,601
Kentucky		X			12,980
Louisiana	X				7,207
Maine		X			0
Maryland		X		P	4000+
Massachusetts		X		P	2,904
Michigan			X		13,103
Minnesota		X			4,210
Mississippi	X				3,373
Missouri	X				13,388
Montana	X				3,043
Nebraska		X			3,641
Nevada		X			1,283
New Hampshire		X	X	P	787
New Jersey		X		P	2,000
New Mexico	X				5,058
New York		X		P	9,189
North Carolina		X		P	9,000
North Dakota	X				3,478
Ohio		X			10,194
Oklahoma	X				7,211
Oregon		X			1,932
Pennsylvania		X	X	P	20,000
Rhode Island		X		P	344
South Carolina		X			9,000
South Dakota	X				6,411
Tennessee		X			12,250
Texas		X			25,500
Utah		X			1,345
Vermont		X		P	0
Virginia		X			8,000
Washington		X		P	2,360
West Virginia	X				5,094
Wisconsin			X		16,776
Wyoming	X				2,486

Farmland Matrix Notes

Column 1 - Preferential Taxation

Column 2 - Deferred Taxation

Column 3 - Deferred Taxation with Restrictive Agreements

Column 4 - Purchase of Development Rights by Local Governments

Column 5 - Number of Billboards in State

Preferential Tax Assesment Only; Preferential Tax Assessment with Deferred Taxation; Preferential Taxation with Restrictive Agreements and Deferred Taxation. Information is from "State Laws Relating to Preferential Assessment of Farmland" by Kimberly A. Grillo and David A. Seid, USDA Economic Research Service, Natural Resources Division, 1987.

Purchase of Development Rights enables a local government to purchase the rights to development, so the farmer can resist development pressures and keep farming. Information is from a 1987 survey by the Farmland Project of the National Association of State Departments of Agriculture Research Foundation, Washington, D.C.

Billboard Inventory 1987, compiled by the National Wildlife Federation. Figures are available from the Coalition for Scenic Beauty, Washington, D.C.

Little NEPA Matrix

	1	2	3	4	5	6	7
Alabama							
Alaska	*						
Arizona			X				
Arkansas							
California	X	X			X	X	X(limited)
Colorado							
Connecticut				X			
Delaware		X	X				
Florida		X	X		X		
Georgia			X				
Hawaii	X	X					
Idaho							
Illinois							
Indiana	X	X					X
Iowa							
Kansas							
Kentucky			X				
Louisiana							
Maine							
Maryland	X					X	
Massachusetts	X	X			X		
Michigan	X	X	X	X			
Minnesota	X	X					
Mississippi			X				
Missouri							
Montana	X	X					
Nebraska			X				
Nevada			X				
New Hampshire							
New Jersey				X	X		
New Mexico							
New York	X	X			X		
North Carolina	X	X			X		
North Dakota							
Ohio							
Oklahoma							
Oregon							
Pennsylvania							
Rhode Island		X					
South Carolina							
South Dakota	X				X		
Tennessee							
Texas				X			
Utah				X			
Vermont							
Virginia	X					X	
Washington	X	X			X	X	
West Virginia							
Wisconsin	X	X				X	
Wyoming							

Little NEPA

Column 1 - State Law Modeled After National Environmental Policy Act

Column 2 - Public Involvement Provision

Column 3 - Environmental Impact Statement Required for Specific Actions

Column 4 - Environmental Impact Statement Required by Executive Order

Column 5 - Private Sector Activities Covered

Column 6 - Major Modifications of Existing Structures Covered

Column 7 - Exemption for Public Agencies

"Little NEPA" refers to state laws modeled after the National Environmental Policy Act. An X in the first column means the state has enacted a law similar to the national law. The * for Alaska indicates that that state has an excellent process for commenting on various actions under the federal NEPA, the functional equivalent of having its own Little NEPA. Most land in Alaska is federally owned.

Public involvement means that public participation, through hearings or comment by environmental and other citizens' groups, is required. An environmental impact statement (EIS) is required for specific actions. An EIS is required by executive order of the governor. The activities of the private sector, such as real estate developers, are covered. Major modifications to existing structures are covered. The activities of public agencies are exempted.

Information is from "SEQURA's Siblings: Precedents from Little NEPAs in the Sister States by Nicholas A. Robinson, Albany Law Review, Vol. 46 No. 4, Summer, 1982, and the Treatise on Environmental Law Vol. II, by Frank P. Grad, Matthew Bender & Co., updated continuously.

The information was supplemented by Robinson, who is compiling proceedings from a November 1987 conference on Little NEPAs sponsored by the Council on Environmental Quality.

Growth Matrix

	1	2	3	4	5	6	7	8	9	10
Alabama	1	128.30	1	21.40	1	113.50	3	263.20	-	-
Alaska	2	4,526.00	1	1,900.00	2	524.00	1	1,900.00	2	4,526.00
Arizona	2	388.10	3	19,132.00			2	18,932.00	1	200.00
Arkansas	1	98.65								
California *	28	32,011.70	36	58,416.40	12	4,038.70	26	88,308.80	9	7,187.80
Colorado	4	3,387.00	2	41.00	1	968.00	4	4,333.50		
Connecticut	1	39.40	5	161.10	1	39.40	3	96.10		
Delaware							11	7,249.20		
Florida	5	5,430.00	13	7,948.20	6	4,755.80	1	270.00	7	4,883.80
Georgia			4	1,584.50						
Hawaii	1	596.00	1	596.00			1	596.00	1	596.00
Idaho	2	1,064.80	3	1,104.10	-	-	-	-	1	1,052.00
Illinois	4	2,085.80	3	460.50	1	6.50	5	ND	-	-
Indiana	-	-	1	36.30	-	-	-	-	-	-
Iowa	3	1,756.00	3	5,856.00	1	459.00	2	1,297.00	-	-
Kansas	-	-	-	-	-	-	1	7.40	-	-
Kentucky	1	285.00	1	21.60	-	-	4	1,463.00	-	-
Louisiana	-	-	-	-	-	-	-	-	-	-
Maine	3	55.20	5	153.80	-	-	3	93.30	-	-
Maryland	8	3,379.00	9	4,030.00	4	1,759.00	-	3,118.00	5	2,215.00
Massachusetts	1	4.80	12	233.30	2	7.60	7	188.90	1	46.80
Michigan	2	66.80	2	66.80	-	-	2	66.80	1	32.40
Minnesota *	7	55,112.90	6	53,957.70	4	192.30	-	53,936.10	-	54,602.00
Mississippi	-	-	2	25.80	-	-	6	624.00	-	-
Missouri	2	126.40	1	65.00	-	-	2	126.40	-	-
Montana	1	11.10	1	11.10	1	11.10	-		1	11.10
Nebraska	2	160.00	2	92.10	-	-	1	100.00	-	-
Nevada	3	20,012.00	1	63.70	2	-	2	200,003.00	2	63.70
New Hampshire	-	-	3	103.80	1	64.10	2	58.10	2	96.20
New Jersey	3	270.50	8	311.70	2	291.00	ND	486.80	-	-
New Mexico	3	149.30	1	95.30	1	95.30	2	126.80	-	-
New York	5	1,768.53	11	1,942.46	3	923.50	5	564.90	1	24.20
North Carolina*	3	604.00	3	195.00	1	419.00	2	429.00	-	-
North Dakota	-	-	1	25.70	-	-	1	25.70	1	25.70
Ohio	1	2.00	1	2.00	-	-	-	-	1	2.00
Oklahoma	1	176.20	1	176.20	-	58.00	-	-	-	-
Oregon *	19	14,794.90	13	11,488.50	4	18.60	13	2,816.80	2	1,876.90
Pennsylvania	2	2.60	2	2.60	-	-	-	-	-	-
Rhode Island	1	59.80	4	89.80	1	13.10	-	-	-	-
South Carolina	-	-	1	13.40	-	-	2	827.40	1	814.00
South Dakota	-	-	1	40.70	1	40.70	-	-	1	40.70
Tennessee	3	296.50	4	307.40	-	-	6	325.00	-	-
Texas	-	-	6	532.20	4	355.50	4	191.70	1	5.90
Utah	-	-	3	2,062.90	1	2,018.00	1	20.20	1	2,018.00
Vermont	5	9,623.80	4	94.00	1	ND	-	9,622.80	-	-
Virginia	3	1,289.00	4	1,679.90	2	776.90	3	932.00		
Washington	3	2,967.00	3	2,967.00	1	212.00	1	212.00	-	-
West Virginia	-	-	-	-	-	-	-	-	-	-
Wisconsin	4	2,749.00	2	968.00	-	-	3	2,173.00	-	-
Wyoming	-	-	-	-	-	-	-	-	-	-

Growth Matrix Notes

Column 1 - Number of Programs for Growth Boundary

Column 2 - Growth Boundary (Square Miles)

Column 3 - Number of Programs in Cluster Zoning

Column 4 - Cluster Zoning (Square Miles)

Column 5 - Number of Programs in Transferable Development Rights

Column 6 - Transferable Development Rights (Square Miles)

Column 7 - Number of Programs in Development Timing

Column 8 - Development Timing (Square Miles)

Column 9 - Number of Programs in Urban Rural Service Assessment

Column 10 - Urban Rural Service Area Assessment (Square Miles)

From survey by Population-Environment Balance, for "Community Responses to Population Growth and Environmental Stress," published in July 1987. Survey was done by telephone, contacting 1,500 communities nationwide. * Indicates land area under-reported for certain categories. Population-Environment Balance estimates that there is general under-reporting.

The growth boundary or urban limit is a line separating urban and rural areas. It represents a predesignated limit to urban sprawl and is usually designed to protect open space, agricultural land or other natural amenities. A growth boundary usually defines the limit within which the full range of urban services, such as water and sewer, will be provided.

Cluster Zoning provides the developer with the option of grouping units close together in a small portion of the total area available for development, provided that the overall number of units does not exceed local ordinance limitations. It provides an environmental and esthetic advantage to the community (by providing open space). It allows an economic advantage to the developer by reducing capital outlay for roads, water lines, power lines and sewer lines.

The Transferable Development Right (TDR) allows communities to direct the location of growth and concentrate it in designated areas. This approach generally requires the designation of "sending" and "receiving" zones with special conditions attached to each. It allows landholders in the "sending" zones to reap a market value return for their land without actually converting it to its "highest and best" use - thereby preserving the agricultural or open space amenities of the land. In the "receiving" zones, developers can increase their marginal profit by increasing density through the purchase of the off-site development rights.

Development Timing is an emerging tool which has found acceptance in some of the newer growth management programs. It is advice which establishes a timing "sequence" for public facilities, building permits and development plans so that new development is absorbed gradually into the community.

The Urban and Rural Service Area Assessment (URSAA) is another device which allows a community to guide growth through economic incentives and disincentives. This device classifies each parcel of land within its jurisdiction according to whether it is slated to receive services such as public sewer and water. The areas that will eventually receive those services are classified as urban and the tax assessments are set accordingly. Those which will not receive services are classified as rural and benefit from a lower tax assessment.

Wetlands Matrix

	1	2	3	4	5	6	7	8	9	10
Alabama	1		1	1	2	1	1	1	1	1
Alaska	1					1			1	
Arizona	1		1						1	
Arkansas	1			1						
California	1	1	2	6		1				1
Colorado	1			1						
Connecticut	1	1	1	3		1	2	1		
Delaware	1		2	2	1	1	1			
Florida	1		2	4	1	1	3	1	2	
Georgia	1		1	3	1	1	3		1	
Hawaii	1						1		1	
Idaho	1	1	1	2						
Illinois	1		1	2	2					
Indiana	1	1		1			1		2	
Iowa	1		2	1						
Kansas	1		1		2				2	
Kentucky	1		2	2	1					
Louisiana	1		1	1		1		2		
Maine	1		4	2		1	4	1	3	
Maryland	1	1	2	3		1	2			
Massachusetts	1	1	1	5		2	2	2	1	
Michigan	1	1	1	3	1	3	1	2		
Minnesota	1	2	1	2				1		
Mississippi	1		2	3		1	1			
Missouri	1	2	1	1						
Montana	1									1
Nebraska	1	1		1						
Nevada	1								2	
New Hampshire	1		1			2	2	1	1	
New Jersey	1		2	4	1	1	3	1		
New Mexico	1		1	2	1					
New York	1	1	2	3	1	1	1	1		
North Carolina	1	1	2	3	3	2	2			
North Dakota	1									
Ohio	1		1	2	2				1	
Oklahoma	1									
Oregon	1		2	1	3	2	3	1		
Pennsylvania	1		1	4		2	3	1		
Rhode Island	1		1	1	1	1	1	1		
South Carolina	1		2	2	2	1	2		1	
South Dakota	1			2						
Tennessee	1		2	2			1		1	1
Texas	1			1		1	1			
Utah	1								1	
Vermont	1		1	2				2	1	
Virginia	1	1	3	4	2	1	2			
Washington	1	1	1	1	1	1	2	1		
West Virginia	1			2			2		2	
Wisconsin	1		1	1	1	2	5	2	5	
Wyoming	1									

Wetlands Matrix Notes

Column 1 - Number of Basic Wetland Program Under Section 401 of the Clean Water Act

Column 2 - Number of Protections Provided by a State Version of the National Environmental Policy Act

Column 3 - Number of Programs Under Tax Policy

Column 4 - Number of Aquisition Programs

Column 5 - Number of Research Programs

Column 6 - Number of Wetland-Specific Coastal Programs

Column 7 - Number of Other Coastal Programs Also Protecting Wetlands

Column 8 - Number of Inland-Specific Programs

Column 9 - Number of Other Inland Programs Also Protecting Wetlands

Column 10 - Number of Executive Orders Protecting Wetlands

Source: "State Wetland Protection Programs - Status and Recommendations" prepared for USEPA Office of Wetlands Protection by C. Deming Cowles, Lisa Bennett Haas, Glenn J. Akins, William Britt, Terry Huffman and Amy Wing, December, 1986.

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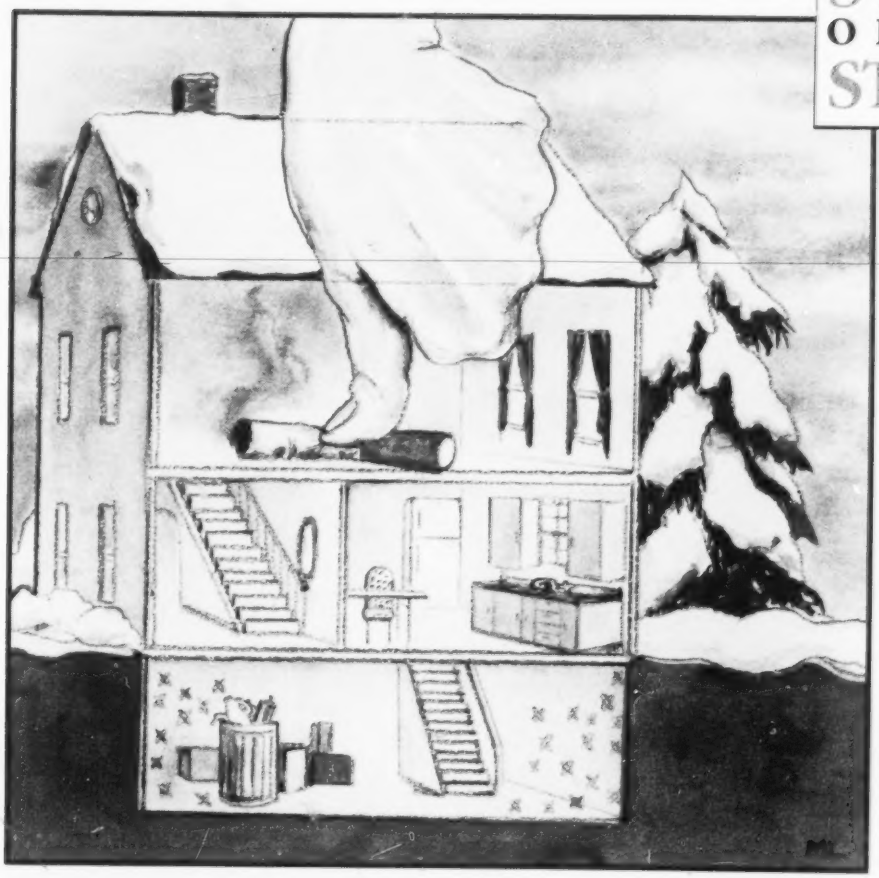

ELIMINATING INDOOR POLLUTION

4

FOCUS PAPER

RENEW AMERICA PROJECT

Prepared by:

Sheila Machado and Scott Ridley
The Renew America Project
May 1988

The Renew America Project is a non-profit, tax-exempt educational organization dedicated to the efficient use of all natural resources. The Project provides individual citizens, state agencies and private organizations with information to assist grassroots change to ensure a clean, safe and livable environment for future generations. For further information on the Renew America Project or to obtain additional copies of this report contact: Renew America, 1001 Connecticut Avenue, N.W., Suite 719, Washington, D.C. 20036, (202) 466-6880. See page 23 for ordering information.

Introduction

The purpose of the Indoor Pollution Focus Paper, one of six focus papers designed to supplement the data in the 1988 State of the States report, is to provide more detailed information on the status of indoor pollution programs and policies in the fifty states. It provides a national picture of indoor pollution prevention efforts through maps, matrices, and explanation of key issues, and it allows comparison of the strength of state programs and policies. It is not intended to be a comprehensive assessment of indoor environmental conditions in each state, but an accurate measure of key legislation and programs states have put in place to protect public health, air, and water in indoor environments.

Tobacco smoke, radon, lead in water and paint, asbestos, and formaldehyde are a few of the primary pollutants we encounter indoors. One federal study concluded that indoor exposures to almost every chemical examined were greater than levels measured outdoors. Unlike many other environmental issues, indoor pollution is a cutting-edge topic with few established standards for pollutants, little coordination between agencies and minimal funding. Because the federal government is shifting greater responsibility to the states for environmental issues, public awareness of state progress, or the comparative lack of it, is critical. For further information, please see the contact list on page 22.

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INDOOR POLLUTION & RADON

Points for Policies & Programs

10-9 FL, NH, NJ, NY

8-7 AK, CT, DE, IN, PA, RI, WI

6-5 CA, CO, ID, IL, IA, KS, ME, MA, MI, MN, NM, OH, OR, UT, VA, VT, WA

4-3 AL, AZ, AR, GA, KY, MO, MT, NE, NC, ND, OK, SC, SD, TN, WV

2-1 HI, LA, MD, MS, NV, TX, WY

Key to reading the map

Example: New Jersey - Best Overall

10 points for policies & programs

4648/26 - number of Terradex Corp. radon tests done from 1980-9/87/% of test results recorded radon levels greater than 4 pCi/l

Radon Source: Terradex Corp., 1987

Policies & Programs Source: The Fund for Renewable Energy and the Environment, 1988

Eliminating Indoor Pollution

On December 14, 1984, on his way into work at the Limerick Nuclear Power Plant in Pottstown, Pennsylvania, Stanley Watras set off a radiation monitor. The plant was inactive at the time, but testing at Watras' home showed radiation levels in the living room 700 times higher than the maximum considered safe for human exposure.1 Further testing traced the radiation to gas given off by underground uranium. The incident sent a wave of concern through Pennsylvania and states with similar geologic deposits. According to federal officials at the Environmental Protection Agency, the danger of cancer caused by radon in the home is 100 to 1,000 times greater than the dangers posed by living near a Superfund toxic waste site. 2

Pollution of indoor air and water has long been a problem. But over the past decade especially, as we have sealed up buildings to cut energy costs, ventilation has been reduced and the concentration of pollutants in the air increased. The occurrences of "sick building" syndrome, also known as "tight building" or "new building" syndrome, are increasing. The occupants of a "sick" building become ill or experience skin irritation or other symptoms from air pollutants within the building.

Ventilation, which has for centuries been the primary means of providing adequate air quality, can often be improved to reduce the concentration of pollutants. But strong measures may be required. For example, few pollutants have the staying power of tobacco smoke. As a result, four times as much ventilation is recommended for buildings with smokers than for smoke-free buildings.

In addition to the decrease in ventilation during the past decade, more sophisticated monitoring has also helped to pinpoint indoor pollution from toxic air and drinking water contaminated with chemical pollutants. A series of tests conducted by EPA from 1980 to 1985 showed that indoor exposures to almost every chemical examined were often much greater than levels measured outdoors. 3

Some compounds, such as carbon monoxide, can be highly toxic with a single exposure. Other pollutants, such as radon, tobacco smoke, formaldehyde, asbestos, or lead usually deliver harm from prolonged or periodic exposure to relatively low levels. The effects may not be apparent for years. And while most of us spend the majority of our time indoors, the very young, the elderly, and those who are ill or sensitive to particular chemicals, are especially at risk.

Unlike many other environmental issues, indoor pollution is a cutting-edge topic with few established standards for pollutants, little coordination between agencies, and little funding. Lance Wallace, an EPA scientist who has directed research on indoor air pollution, says, "We're spending $200 million a year trying to reduce outdoor air pollution and $2 million a year on indoor air pollution. Frankly, I think it should be reversed."4

Tobacco Smoke

Cigarette smoke has received the greatest attention as an indoor pollutant. The federal government began action on smoking following a report in January 1964 from the Advisory Committee to the U. S. Surgeon General that indicated cigarette smoking as a cause of illness and premature death. A warning was required on each cigarette pack, and a ban on cigarette advertising on television followed. More recently, federal rules have restricted smoking to designated areas in all federal buildings. And on April 23, 1988, a federal law barring smoking on all airline flights of two hours or less is scheduled to go into effect.

An estimated 52 million adults and two million teenagers in the United States smoke about 600 billion cigarettes annually. While the price of cigarettes for an individual is about $12 per carton, the federal Office of Technology Assessment estimates society pays $20 when the full subsidies, health and environmental cost impacts are taken into account. 5

Cigarette smoking accounts for some 300,000 to 350,000 deaths every year, and more than just the smoker is affected. Disease due to inhalation of tobacco smoke extends to those who inhale the "side-stream" from tobacco smoke.

Tobacco smoke contains about 3,800 chemical compounds including benzene and other carcinogens. People exposed to sidestream smoke often absorb nicotine, carbon monoxide, and many additional noxious compounds in concentrations higher than smokers. In 1986, a National Research Council review of studies on passive smoking estimated that nonsmoking spouses of smokers face a 30 percent increase in their chance of incurring lung cancer, in

Indoor Pollution Main Matrix

	1	2	3	4	5	6	7	8	9	10
Alabama	0	.165	115	467.7	D/3/$75	-/Y	59/32.2	-	P	
Alaska	3	.16	124	65.2	F/.25/0	X/Y	536/17	*	O	S
Arizona	2	.15	101	341.8	F/1/$58	-/N	5/ 40	-	I	
Arkansas	1	.21	125	297.7	I/<.O1/0	-/N	89/18	4355/135	D	
California	3	.10	94	2612.1	F/.75/$109	-/D	689/4.5	U	I	C/L
Colorado	3	.20	107	353.7	D/.25/0	-/Y	287/45.6	96/0	D	
Connecticut	4	.26	107	344.2	D/5.5/$400	-/Y	173/19.7	U	I	S
Delaware	1	.14	137	88.4	F/.3/$10	X/N	47/12.8	5509/87	I	
Florida	4	.24	117	1407.5	O/2.5/$1000	X/Y	247/11.3	25630/U	I	S
Georgia	1	.12	124	770.2	F/1/O	-/N	73/13.7	7802/77	P	
Hawaii	2	.30	60	64.5	I/<.O1/0	-/N	1/0	-	I	
Idaho	3	.18	97	97.3	F/1.5/0	-/D	791/41	2831/0	O	
Illinois	0	.20	118	1361.9	D/3.25/$130	-/N	796/26.6	70976/1300	I	
Indiana	2	.155	137	757.6	D/2.5/0	X/D	184/35.9	5333E/U	I	
Iowa	2	.26	106	300.9	F/1/$123	-/N	74/35.1	U	O	
Kansas	2	.24	108	267.7	D/1/0	-/Y	13/23.1	5861/41	P	
Kentucky	1	.03	180	670.5	D/2/0	-/N	107/28	7103/90	D	
Louisiana	0	.16	122	543.2	I/.1/0	-/N	25/4	61822/229	D	
Maine	4	.28	117	138.5	O/3.5/O	X/Y	1496/23	*	I	
Maryland	2	.13	118	535.1	D/2/0	-/N	208/26.9	*	I	
Massachusetts	2	.26	115	674.4	F/1.5/O	-/Y	231/16	135000/686	I	C/L
Michigan	3	.21	125	1151.5	D/1.5/0	-/Y	95/22.1	41864/466	P	S
Minnesota	4	.38	103	439.4	F/.5/O	-/Y	255/36.1	U	I	S
Mississippi	1	.18	113	295.8	I/<.O1/O	-/N	15/0	-	D	
Missouri	0	.13	127	648.6	F/.1/O	-/N	64/9.4	11573/1900-UC	P	
Montana	4	.16	100	80.9	F/.25/O	-/N	326/33.1	*	D	
Nebraska	4	.27	104	165.7	F/.25/O	-/Y	15/33.3	1953/43	D	
Nevada	2	.20	132	132.6	I/<.01/O	-/N	313/14.1	U	P	
New Hampshire	2	.17	185	195.4	F/1/$105	X/N	97/39.2	2103/0	I	S
New Jersey	4	.27	114	873.4	O/26/$4340	X/Y	4648/25.5	51260/U	I	
New Mexico	3	.15	85	127.7	F/1.5/0	-/N	633/25.8	-	I	C/L
New York	2	.21	114	2025.5	O/19/$7867	X/Y	4945/11.8	196043/2270-UC	I	C/L
North Carolina	0	.02	151	965.7	F/NA/0	-/Y	93/12.9	12118/43	I	
North Dakota	3	.27	102	68.4	F/1/O	-/Y	53/28.3	479/0	I	
Ohio	2	.18	126	1358.6	F/1.5/O	-/Y	432/38.7	22691/U	O	S
Oklahoma	2	.23	121	394.6	F/.125/O	-/D	22/18.2	-	I	
Oregon	3	.27	110	300.8	F/.05/O	-/N	5896/4.9	-	I	C/L
Pennsylvania	2	.18	113	1351.4	O/21/$5300	X/Y	22325/56.8	20047/394	P	
Rhode Island	2	.25	134	132	D/.33/O	X/N	31/22.6	12418/172	I	S
South Carolina	1	.07	124	423.7	F/.5/0	-/N	26/3.8	45775/108	D	
South Dakota	2	.23	97	68.8	I/.5/O	-/N	606/28.2	*	D	
Tennessee	0	.13	126	612.9	D/3/$150	-/N	540/25	-	D	
Texas	2	.205	110	1845.9	I/.O625/0	-/N	468/.6	U	I	S
Utah	4	.23	64	107.7	F/.5/$38	-/Y	29/17.2	U	D	
Vermont	1	.17	128	70.2	F/.25/0	-/Y	71/23.9	-	P	S
Virginia	0	.025	131	774.8	D/2.5/0	X/Y	526/13.7	2359E/37E	I	C/L
Washington	4	.31	91	415.4	F/1/$50	-/Y	11775/3.8	U	I	C/L
West Virginia	1	.17	114	217	F/.4/0	-/N	15/20	-	I	
Wisconsin	3	.30	105	503.6	D/2.25/$25	-/N	236/18.6	5502/210	I	S
Wyoming	0	.08	130	63.4	D/2/0	-/Y	136/47.8	-	P	

Indoor Pollution Matrix Notes

Column 1 - State Laws on Smoking

O = no restrictions

1 = nominal; regulations covering smoking in 1-3 public places

2 = basic; regulations covering smoking in 4 or more public places. Note both 1 & 2 have no restrictions on smoking in restaurants or the private workplace.

3 = moderate; regulates smoking in restaurants. 10 states with an average of regulations in 9.5 public places.

4 = extensive; laws regulating smoking in private workplace. 9 states with an average of regulations covering 11 public places.

Source: "State Legislated Actions on Clean Indoor Air, Cigarette Excise Tax and Sales of Cigarettes to Minors," Tobacco-Free Young America Project, April 1987 - revised October 1987.

Column 2 - State Cigarette Tax

Cigarette tax in each state as of 9/87.

Note: There is a $.16 federal tax which is in addition to the state tax. The federal tax is applied to all states.

Source: "Monthly State Cigarette Tax Report - Sept. 1987," The Tobacco Institute.

Column 3 - Millions of Packs Sold

Number sold as recorded by state taxes paid, 1986.

Source: "The Tax Burden on Tobacco Historical Compilation," Volume 21, 1986, p.25. The Tobacco Institute.

Column 4 - Per Capita Cigarette Consumption (Packs per person)

State Population (see Land-use Matrix for figures) / Millions of Packs Sold

Note: Number of packs sold can in some cases reflect sales to out-of-state residents who purchase in one state to avoid home state sales tax.

Column 5 - Radon Programs/ Full-time Equivalent Employees/ Radon Appropriations ($)

State Radon Programs

I = Information; distributes EPA documents; not actively addressing radon issues.

F = Formative; beginning to address, but has not begun extensive testing; limited tests; EPA information and some state information distributed.

D = Developing; extensive statewide testing and surveys; appropriated radon funds or drawn from general funds; may have specific legislation.

O = Operational; confirmed radon problem and addressing it; have or have had a task force; testing; information; training program; some financial assistance for homeowners.

* - Maine is operational in water radon programs and developing an air radon program.

Source: "Summary of State Radon Programs," EPA, August 1987, p. 13.

Radon Full-Time Equivalent Employees. Ibid., p.18.

Radon Appropriations. Amount ($000's). Ibid., p.18.

Column 6 - Free or Subsidized State Radon Testing/State Distributes Information Materials (excludes EPA survey).

Free or Subsidized Testing

x = Yes

Ibid., p. 24.

State Materials distributed

Y = Yes; N = No; D = Developing by state.

Ibid., p. 35.

(all states provide EPA generated materials)

Column 7 - Terradex Corp. Radon Test Results/Percent Greater than 4 pCi/l (from data base of tests from 1980 through Sept. 1987.)

tested

% greater than 4 pCi/l (EPA guideline)

Source: Terradex Corp. "Indoor Radon Data Base," Sept. 1987, pg. 2-3.

Column 8 - Childhood Lead Screening (Children Ages 1-5)/ Confirmed Elevated Lead Level

# of children screened

confirmed lead toxicity

Note: * = did not report data; U = data reported unobtainable by respondent.

UC = under care; E = estimated by respondent.

Source: "Services for Mothers and Children Public Health Agencies 1984," Vol.3, January, 1987, p. 61. Public Health Foundation.

Column 9 - Ban on Lead Products in Drinking Water Systems

P = in process of implementation or under consideration

D = will meet 6/19/88 EPA deadline

I = lead ban has been implemented

O = no information

Source: EPA, Office of Water, "Lead Ban Status," October 1987.

Column 10 - Household Hazardous Waste Collection Programs

S = Statewide

C/L = County or local level

These are states or localities that have had at one time, or currently have, household hazardous waste collection.

Source: "Overview of Nationwide Small Quantity Generator and Household Hazardous Waste Collection Programs," Linda Dunphy, Environmental Task Force, March 1986.

comparison to spouses of nonsmokers. The risk of respiratory problems for smokers' children increases 20 to 80 percent.

Cigarettes are also the cause of an estimated 30 to 40 percent of all home fires. Some 2,300 Americans die each year in cigarette-ignited fires and another 5,000 are injured. Many of these injuries and deaths could be prevented if cigarette manufacturers stopped treating their papers and tobaccos with chemical additives designed to keep cigarettes burning continuously.

As federal policies on smoking have been evolving, 42 states have passed laws that limit or prohibit smoking in public places. These laws range from a simple ban on smoking in school buses to comprehensive clean indoor air laws that limit or prohibit smoking in virtually all public places.

Connecticut was the first state to require restaurants to have nonsmoking sections in 1974. Minnesota passed the first law to protect nonsmokers in workplaces and public buildings in 1975 and a 1987 law bans the free distribution of cigarette samples. The 1975 law prohibited smoking except in designated areas and was considered a model statute for other states. The state of Michigan included smoking laws in its Clean Air Act in 1986, establishing nonsmoking as the norm by extending regulations beyond government offices and workplaces to theaters, health facilities, auditoriums, and many other types of public buildings.

Today, 20 states have comprehensive clean indoor air laws and 22 restrict smoking in public or private workplaces. One of the current trends is for more stringent restrictions from local governments and private companies. More than 200 cities and counties have limitations on smoking in public places. And continued expansion of state prohibitions is likely. However, the federal government has preempted state action in some areas. One of the provisions of the federal Public Health Cigarette Smoking Act of 1969, referred to as the preemption clause, specifically prohibits the states from regulating cigarette advertising.

Radon

Radon is a more recent issue. For cigarette smokers, regular exposure to high levels of radon multiplies the risk of lung cancer, making the chance of developing cancer 10 or more times greater for smokers than nonsmokers, according to the National Research Council. What makes radon a problem are the chemically active heavy metals of lead, polonium, and bismuth it decays into, which behave as ultrafine particles in the air and give off ionizing radiation. These ultrafine particles of radon by-products are electrostatically charged and attach themselves to smoke, dust, clothing, furniture, and walls. If inhaled at excessive levels or for prolonged periods, they can damage lung tissue. EPA considers radon second only to smoking as a cause of lung cancer. [6]

There are three primary sources of radon: soil and rocks (particularly granite, other uranium-bearing rock, and phosphate rock), water, and nuclear wastes. The federal government and a few state governments have known for a decade of potential problems with indoor radon. One of the first broadly recognized incidents of radon contamination was in Grand Junction, Colorado, in the late 1970s.

In the 1950s and 60s, as many as 10,000 homes, stores, and schools were built in Grand Junction and other mining towns using uranium mine tailings, a grey sandy material left over after refining uranium ore. As many 10 million tons of tailings were used in Grand Junction alone. Mixed with cement for foundations and walls, the tailings released high concentrations of radon into the buildings. In this case the federal government which participates in refining uranium has been forced to take action.

In 1978 Congress agreed to commit federal funds to remove the tailings from the houses built in the 1950s and 60s. The Office of Management and Budget pressured EPA in 1980 to adopt a cost benefit approach to cleanup. The resulting standard for radon contamination balances health benefits with cost of cleanup, a measure that does not provide the greatest public protection. A proposed .2 picocuries per liter (pCi/l) guideline was changed to 4 pCi/l, which reduced by 25 percent the number of houses that needed to be decontaminated. This raised a considerable amount of controversy, setting the stage for the Watras case.

The attention given to Stanley Watras' home in Pennsylvania alerted the public to a much broader problem from naturally occurring radon. Hotspots of radon concentrations are often found in geologic deposits of granite, shale, phosphate, and uranium bearing-rock formations and soil. These hotspots have been found in more than 22 states spanning the country. One study has discovered 21 hot properties with excessive radon concentrations in midtown Manhattan. Local variations including soil permeability and housing characteristics can also affect indoor radon levels.

Radon can also contaminate the air as it is released from water. The hazard does not come from ingestion, but as a result of inhaling radon particles while showering, bathing, washing dishes or cooking. As groundwater travels through soil and rocks containing uranium, radium, granite and radioactive materials, it picks up radon gas along the way. In large municipal water systems the problem is minimal since the radon by-products are short-lived and most of the radioactivity dissipates before water reaches the tap. But in smaller systems, the holding times are shorter so less radon decays before it reaches the home. Wells are the most direct and immediate link between groundwater and homes and are the source for the highest levels of radon contamination from water.

In the largest radon study to date, EPA tested 11,600 homes in 10 states and found 21 percent with elevated levels of radon. Although there are no official federal standards for radon contamination, the 4 pCi/l EPA level has been established as a remedial action measure for exposure in the home. One pCi/l is equal to two radon atoms per minute disintegrating in every quart of air. Ten pCi/l in a house represents the same risk as smoking one pack of cigarettes a day. If a person is exposed to 4 pCi/l of radon for 18 hours a day for a year, it is the equivalent of undergoing 200 chest X-rays in a 12-month period. [7]

A National Academy of Sciences study released in January 1988 estimated that an average of two people per 100 will die from radon-induced lung cancer when exposed to 4 pCi/l over a prolonged period, slightly more than the previous EPA estimate of one person in 65. The risk that EPA tolerates for other carcinogens is much lower—on the order of one in 100,000 deaths. EPA officials state that the 4 pCi/l remedial action measure is a cost-based standard reflecting the "reasonable" cost to reduce excessive levels of radon in a dwelling. A house with radon levels greater than 4 pCi/l can be decontaminated (down to the 4 pCi/l level) for between $200 and $2,000.

As many as eight to 12 million homes may have levels above 4 pCi/l and costs could range above $4 billion for installation of ventilation, sealing cracks in basements, and removal of soil. [8] The federal government is reluctant to get involved in the issue beyond monitoring and research. Ironically, the federal government supplied more than $123 million in subsidies to the tobacco industry in 1986, but appropriated only $8 million for radon. [9]

States have begun to take action. Following the lead of Pennsylvania, some states have begun offering low-interest loans for home repairs. Eleven states are offering free or subsidized testing of homes. All states provide EPA generated material and 22 states offer educational materials developed by their state. Five states—Florida, Maine, New Jersey, New York, and Pennsylvania—are conducting the most comprehensive programs.

Asbestos

Asbestos is another carcinogen commonly found in homes, schools, and workplaces. It is a group of minerals composed of tiny, easily inhalable fibers that can easily become airborne or carried by water. If inhaled or ingested, asbestos fibers lodge in tissue where they may cause scarring and cancer.

Asbestos has traditionally been valued for its fire-resistant properties and it is usually found as insulation around water and heating pipes. It may also be found in floor tiles, ceiling panels, patching compounds, fire-resistant textiles, hand-held dryers, and other appliances.

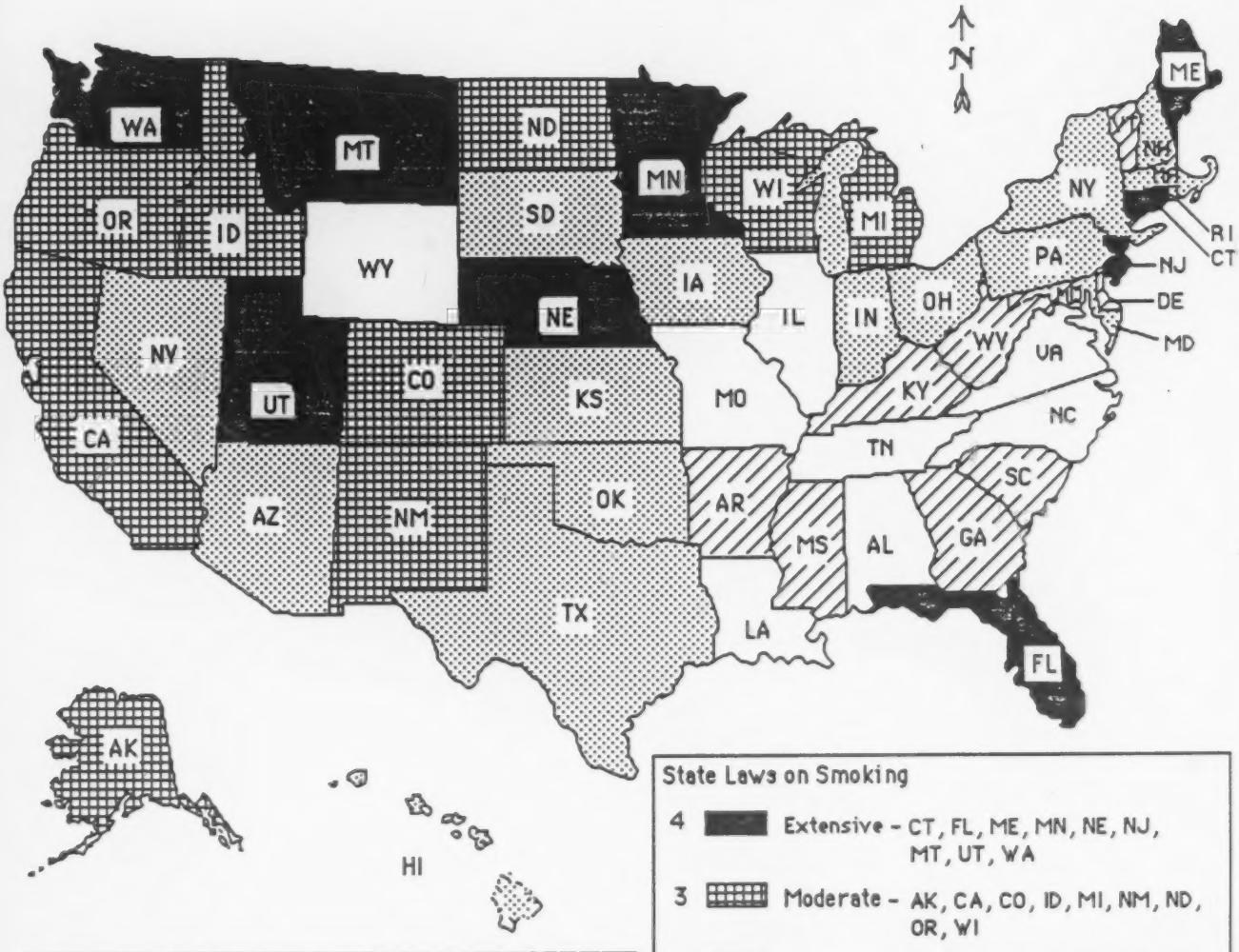
About 400,000 miles of asbestos/cement pipe have been used in drinking water supply systems in the United States. But over the past decade asbestos has been banned for use in certain pipe coverings, patching compounds, and artificial fireplace logs. All uses of asbestos are expected to be banned over the next ten years. School buildings are the first institutions targeted for cleanup.

It is estimated that about 15 million students and 1.4 million workers are exposed to asbestos in schools. In 1986, Congress passed the Asbestos Hazard Emergency Response Act (AHERA), requiring all public and private schools to be inspected and state governors to submit asbestos management plans to EPA by October 1988. Implementation of the plans must start by July 9, 1989 and be completed in a timely fashion. EPA has awarded grants to 12 states to support costs for inspection and development of management plans.[10] Kansas, New Jersey, Oklahoma, and Rhode Island are examples of states that have adopted extensive abatement standards which go beyond federal standards.

Other states are moving quickly to pass asbestos-related legislation. One of the largest dangers they seek to address is improper removal of asbestos. Currently 39 states require some form of accreditation of asbestos removal contractors.

State enforcement mechanisms vary widely, but most states have the capability of conducting on-site inspections of clean up operations and civil fines can be levied in 31 states.

State Smoking Laws



State Laws on Smoking

4	Extensive	CT, FL, ME, MN, NE, NJ, MT, UT, WA
3	Moderate	AK, CA, CO, ID, MI, NM, ND, OR, WI
2	Basic	AZ, HI, IN, IA, KS, MD, MA, NV, NY, NH, OH, OK, PA, RI, SD, TX
1	Nominal	AR, DE, GA, KY, MS, SC, VT, WV
0	None	AL, IL, LA, MO, NC, TN, VA, WY

Map Notes:

Numbers (4,3,2,1, 0) refer to Indoor Main Matrix on page 4.

Extensive smoking laws - regulate smoking in private workplaces and an average of 11 other public places.

Moderate smoking laws - regulate smoking in restaurants and an average of 9.5 other public places.

Basic smoking laws - regulate smoking in 4 or more public places but do not include restaurants or private workplaces.

Nominal smoking laws - regulate smoking in 1-3 public places but not restaurants or private worplaces.

None - no smoking laws

Source: Tobacco-Free Young America Project, Washington, DC, October 1987.

Fifteen states provide money for asbestos problems in privately owned buildings. Bonds and the general fund are the primary source for management plans in privately owned buildings. Grants, license fees and the general fund are the common source of funding for state regulatory programs.

Several states offer educational material to citizens, and Rhode Island has declared an effort to make its buildings "the most asbestos-safe in the United States." Free educational classes have been held in every community in Rhode Island.

Lead

Lead is another toxic commonly found in homes. EPA has estimated that one in five Americans drink water contaminated with unsafe levels of lead. 11 Those at greatest risk are children whose bodies absorb a higher percentage of lead that is ingested. A 1986 EPA report stated that as many as 250,000 children have suffered small but measurable IQ losses as the result of consuming lead-contaminated water. 12 Chronic exposure to low levels of lead contamination can damage the brain and nervous system of a child and cause an array of effects and symptoms for adults, including poor appetite, fatigue, hypertension, and diminished mental capacity. The toxic effects of lead, particularly those on the central nervous system of children, are permanent and irreversible.

EPA has proposed cutting standards for the amount of lead in drinking water by more than half, from 50 parts per billion to 20 parts per billion. But this alone will do little to address the problem.

Lead occurs in drinking water primarily as a corrosive by-product. Natural levels of lead in surface and groundwater in the U.S. are low (less than 2 ppb) and water leaving a water system's treatment plant is relatively lead-free. Most lead gets into water as it is transported from the plant to the tap through the pipes and solder containing lead. Highly corrosive water -- soft, low pH, poorly balanced and acidic -- picks up the most lead. The cities of Boston and Seattle have successfully treated their water to make it less corrosive.

Another factor that increases corrosion is the practice of grounding electrical equipment (such as telephones) to water pipes. Any electrical current passing through the ground wire will accelerate the corrosion of lead in pipes.

Another problem according to EPA is that water coolers in schools, offices, and other public places can release high concentrations of lead. Deposits of lead come from coated water tanks or lead solder on connecting coils. Federal law requires that water be tested only in reservoirs, water towers, and other places where public supplies are stored. Until recently homes with lead pipes and public and private water coolers fell through regulatory cracks.

The Safe Drinking Water Act amendments passed in 1986 require state governments to ban certain uses of lead in plumbing and to revise standards for other uses. States have until June 1988 to implement and enforce these new measures. The amendments forbid the use of pipe, solder, or flux that is not lead-free in the installation or repair of any public water system or in any plumbing system providing water for human consumption. The term lead-free means that solders and fluxes must contain not more than 0.2% lead (in the past solder was 50% lead) and pipes and fittings not more than 8% lead.

Twenty-six states have already banned the use of lead in drinking water systems. Six states -- Maryland, Vermont, Minnesota, Colorado, Massachusetts, and Utah -- have begun special monitoring to pinpoint problem areas with high lead levels.

Paint containing lead covers 25 million housing units and many older homes have lead paint on interior surfaces. Young children are in danger of playing in soil contaminated with lead paint chips or ingesting them. The Department of Housing and Urban Development has informed local housing officials that finding and removing lead-based paint in public housing throughout the nation will cost as much as $500 million and that local agencies will have to bear the cost.

Since the early 1970s, as many as 40 states have organized programs to conduct blood-lead screening tests on children in areas with deteriorating housing stocks. A few major cities -- Baltimore, New York, Louisville, and Boston -- are widely recognized as having model programs.

In 1982, federal funding for lead screening programs was cut and many of the programs have been eliminated or vastly reduced in size. Before 1982, lead screening was a nationwide program administered by the Centers for Disease Control. Now lead screening programs are funded with block grants incorporated into the Maternal and Child Health Act. States set their own priorities for the use of these funds and are not required by the federal government to create or maintain lead screening programs.

The overall problem with lead is that so much of it is used. It ranks fifth among tonnage of all metals used in the U.S. And

not only is it toxic, but it accumulates in the body. In addition to water and painted surfaces—foods, dust and soil (which contain lead from paint and emissions from auto exhaust and leaded gasoline) contribute to elevated blood lead levels.

Auto emissions, flaking paint, and smelters have left a legacy of 4 to 5 million metric tons of lead in dust, soil and sediment. Children encounter it in backyards, fields, playgrounds, especially those located near highways or smelting plants. In October 1987 health officials in Connecticut uncovered 28 cases of lead poisoning among children living in a low-income section of Thompson, Connecticut. In the previous 18 months 21 percent of children tested positive for lead poisoning. The source of the problem was traced to Thompson's soil, but it has not been determined how the lead got there.

Formaldehyde

Another emerging indoor pollution issue is formaldehyde contamination. Formaldehyde is found in the resins used in more than 3,000 products including building materials such as particle board, cosmetics, insulation, toothpaste, and new car interiors. It is highly prized by the chemical industry as a preservative and bonding agent. The problem is that formaldehyde resins break down and give off a toxic gas.

Indoor formaldehyde levels are consistently higher than outdoor levels. Mobile homes with a high density of building materials per air volume, energy-efficient "tight" homes, and homes with urea-formaldehyde insulation can have particularly high indoor formaldehyde concentrations. A heavy smoker can also be exposed to a considerable amount of formaldehyde. Cigarette smoke contains as much as 40 parts per million (ppm) of formaldehyde by volume. Other potential sources of formaldehyde in the home include combustion in gas stoves and heaters.

Materials containing formaldehyde emit the highest levels of gas when new, but continue to emit vapors for years. Often it gives off a pungent, pickle-like odor. It is a known irritant to skin, eye, nose, and throat and has also been associated with difficulties in breathing, nosebleeds, and various asthma-like reactions, headaches, fatigue, menstrual problems, and nausea.

The National Research Council estimates that as much as 10 percent of the population in the United States may be hypersensitive to formaldehyde, even at low levels of concentration. A National Academy of Sciences study showed that subjects exposed to formaldehyde vapors at 0.5 - 1.5 ppm experienced some form of irritation and/or desire to leave the room. Indoor formaldehyde levels in U.S. homes vary from about .02 ppm to 1.0 ppm or more, compared with outdoor levels of below .016 ppm.

Given the growing concern about this compound, new measures to regulate formaldehyde appear likely. As a first step, in April 1987, EPA upgraded the classification of formaldehyde from a "possible" carcinogen to a "probable" carcinogen. 13

This report covers very briefly only a few of the indoor pollutants we commonly encounter. There is a need for cataloging and timely action for all indoor pollutants. No-cost measures such as warning labels on products containing formaldehyde, requirements for homes to be tested for radon or lead pipes or paint before a sale can be transacted, and removal of government subsidies for the tobacco industry, are among initial steps that can be taken. Additional steps for programs needing funds, such as monitoring, cleanup, and screening programs, could be balanced on charges for water, licenses for cleanup contractors or similar fees and taxes on tobacco and other products.

In moving to safeguard the indoor environment it is essential that the federal government maintain a strong role for research, technical support, the formulation of minimum standards, and deadlines for action by the states.

State governments, of course, have a significant responsibility to upgrade standards to meet local conditions and to initiate, monitor, and enforce policies to protect the indoor environments of its citizens in homes, workplaces, and public facilities. The matrix information on the following pages provides profiles of what states are accomplishing on these topics.

Indoor Pollution Text Notes

1. *Radon The Invisible Threat* , Michael Lafavore, Rodale Press, 1987, p.10.

2. The Kansas City Star, May 10, 1987. (The estimation is attributed by the reporter, Yael Abouhalkah, to Dick Morgenstern at EPA.)

3. *EPA, The Total Assessment Methodology (TEAM) Study; Summary and Analysis, Vol. 1,* EPA, Washington, DC, June 1987.

4. Fen Montaigne, "No place like home—but only if it's not polluted," The Boston Globe, July 26, 1987.

5. *Smoking-Related Deaths and Financial Costs,* Office of Technology Assessment, Sept. 1985, p. 4.

6. Cass Peterson, " '84 Estimate of Radon Cancer Risk Revised Upward," Washington Post, Jan. 6, 1988.

7. Sam Hankin, "Plan to Toughen Radon Rules Meets Resistance," Washington Post, Feb. 20, 1988.

8. "Environmental News," EPA, Washington, D.C., August 4, 1987.

9. *Tobacco: Situation and Outlook Report*, U.S. Department of Agriculture, Economic Research Service, June 1987, p. 29.

10. "State Asbestos Programs Related to Asbestos Hazard Emergency Response Act," National Conference of State Legislatures, Jan. 1988.

11. *Lead and Your Drinking Water*, EPA, Office of Water, April, 1987.

12. Mike McClintock, "Getting the Lead Out," Washington Post, Feb. 11, 1988.

13. "Indoor Air Pollution Fact Sheet," American Lung Assoc., Aug. 1986.

Bibliography

1. Tobacco - Situation and Outlook Yearbook, U.S. Dept. of Agriculture, Economic Research Service, Washington, D.C., December 1987.

2. 1985-86 State & Local Programs on Smoking and Health, U.S. Dept. of Health and Human Services (HHS), Office on Smoking and Health, Rockville, MD.

3. The Health Consequences of Involuntary Smoking, U.S. Dept. of HHS, Rockville, MD, 1986.

4. EPA, Summary of State Radon Programs, Office of Radiation Programs, Washington, D.C., August 1987.

5. Public Health Agencies 1984, Services for Mothers and Children, Public Health Foundation, Washington, D.C., Vol.3, January 1987.

6. State Legislated Action on Clean Indoor Air, Cigarette Excise Taxes, and Sales of Cigarettes to Minors, Tobacco-Free Young America Project, Washington, D.C., October 1987.

7. Selling Smoke: Cigarette Advertising and Public Health, Kenneth E. Warner, Ph.D., American Public Health Association, Washington, D.C., October 1986.

8. The Tax Burden on Tobacco, The Tobacco Institute, Washington, D.C., Vol. 21, January 1987.

The Final Scores

	Indoor Pollution Points	Total Points	Overall Ranking
Massachusetts	6	45	1
Wisconsin	8	45	
California	5	44	3
New Jersey	*10	44	
Connecticut	8	43	5
New York	9	42	6
Oregon	5	42	
Florida	9	41	8
North Carolina	4	40	9
Hawaii	2	38	10
Michigan	6	38	
Minnesota	6	38	
New Hampshire	9	38	
Rhode Island	7	37	14
Maine	6	36	
Vermont	5	36	
Maryland	2	35	17
Iowa	6	34	18
Virginia	6	34	
Delaware	7	32	20
Washington	6	32	
Nebraska	4	31	22
Pennsylvania	8	31	
Ohio	5	30	24
Colorado	5	29	25
Illinois	5	29	
Montana	3	29	
Utah	5	29	
Indiana	7	28	29
Georgia	3	27	30
South Dakota	3	27	
North Dakota	4	26	32
West Virginia	3	26	
Arizona	4	25	34
Idaho	5	25	
Kansas	5	25	
South Carolina	4	24	37
Kentucky	3	23	38
Missouri	3	23	
New Mexico	5	22	40
Alabama	4	21	41
Alaska	7	21	
Louisiana	2	20	43
Tennessee	3	20	
Nevada	2	19	45
Oklahoma	3	19	
Texas	2	19	
Arkansas	4	17	48
Mississippi	1	17	
Wyoming	2	15	50

Key:

Indoor Pollution Points are based on a scale of 1 to 10. The points were derived from the data in the matrices and measure the strength of state programs and policies to protect the environment. See "Ranking Notes" on page 13 for detailed explanation.

Total Points consist of a maximum score of 60 points. Each of the six topics in the 1988 main report have a maximum value of 10 points. (The six topics are: Indoor Pollution, Surface Water Protection, Reducing Pesticide Contamination, Land Use Planning, Highway Safety, and Energy Pollution Control.) The point values for each topic are added together to give the state's total point score.

Overall Ranking is the ranking of the states based on the total points received for all six topics. In the case of a tie each state is given the same ranking. Example: Both Massachusetts and Wisconsin received 45 points and tied for first place.

Summary Example: With 38 points, Hawaii ranks 10th in the nation for the strength of state environmental programs examined. For indoor pollution, Hawaii received only two points on a 10 point scale. The two points received for indoor pollution were added together with the points received for the remaining five topics to equal the total point score of 38.

* **New Jersey** was judged to have the strongest programs and policies for eliminating indoor pollution and received 10 points (see Indoor Pollution Snapshot).

Indoor Pollution Snapshot

New Jersey represents some of the most extensive programs to eliminate indoor pollution. The state is among those with the best developed policies to limit smoking. Protected areas include restaurants, workplaces, government buildings, public transportation, and health facilities. The state also has a cooperative effort to address radon problems with the Department of Environmental Protection, Department of Consumer Affairs, and Department of Occupational Health taking part.

The state distributes educational materials and provides free screening for homeowners and low-interest loans for improvements to alleviate the problem.

New Jersey has also implemented a ban on the use of lead in drinking water systems and conducted testing of children for elevated blood lead levels.

Currently:

- nine states have the most developed no-smoking regulations for a variety of public buildings, public transportation, restaurants, and workplaces;
- five states have operational radon programs that offer free or subsidized testing of homes and distribution of educational materials;
- 15 states offer only educational materials on radon;
- 26 states have implemented bans on the use of lead in drinking water systems;
- 18 states have had state, county, or local household hazardous waste collection programs.

Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring, enforcement, and indications of progress. Although programs mandated by state legislatures rather than innovative projects, receive greater weight, attention is given to assure that states have not simply "papered-over" a problem with new legislation.

The evaluation is both comparative and subjective and is not intended to represent an absolute scale in which the top state is doing everything possible to protect the environment on a given topic. Research material and data on which the rankings are based are drawn from a variety of sources: individual telephone and mail surveys of the states; information filed by the states with federal agencies; studies and surveys conducted by academic institutions, private contractors, and national environmental organizations; and information from reviewers regarded as experts on the topics. In each case, we have utilized what we believe to be the best data available.

The primary indicators for indoor pollution policies and programs were: state no-smoking policies; the status and staffing of radon programs, as well as funding and testing available to residents; radon education programs; and data on the number of homes tested and the percentage found with excessive radon levels. Also considered were the numbers of children tested for lead poisoning and whether states have bans on the use of lead in drinking water systems in development or implemented. A final element was whether a state has ever implemented or utilized local or statewide household hazardous waste collection programs.

Each of the factors of smoking, radon, and lead was given equal weight in the ranking. The few states with little potential radon threats (according to geological maps produced by the Environmental Protection Agency) received no positive or negative weight for this topic. Household hazardous waste collection was considered as a final element to raise the total points.

Tobacco Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Alabama	x/Y																	
Alaska	x	x	x	x	x	x		x	x	x		x		x	x	x	x	
Arizona	x	x	x	x	x	x									x	x		
Arkansas		x-1				x									x			
California		x		x	x	x				x		x		x	x			x-3
Colorado		x	x	x	x	x									x			
Connecticut	x/Y/C*	x	x	x		x				x		x		x	x	x	x	
Delaware		x																
Florida	*	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	
Georgia	x	x	x															
Hawaii			x	x	x					x								
Idaho	x	x	x	x	x	x				x	x	x		x	x			
Illinois	x																	
Indiana	x			x		x									x			
Iowa	x/*	x	x	x	x	x		x	x	x	x			x	x	x	x	x
Kansas		x	x	x	x	x		x	x	x	x	x	x	x	x	x		
Kentucky															x			
Louisiana	*																	
Maine		x		x		x				x	x	x		x			x	
Maryland		x	x			x				x				x				
Massachusetts	x	x	x	x	x	x		x	x		x	x		x	x			x
Michigan	x	x-1	x	x	x	x			x	x	x	x		x	x	x		
Minnesota	C	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	
Mississippi		x																
Missouri																		
Montana		x	x	x	x	x		x	x	x	x	x		x	x	x	x	
Nebraska		x	x	x	x	x				x		x		x	x		x	
Nevada		x	x	x	x	x				x					x			
New Hampshire		x	x	x	x	x				x		x		x	x		x	
New Jersey		x	x	x	x	x		x	x		x	x		x-2		x	x	
New Mexico			x	x	x	x				x					x		x	
New York		x																
North Carolina																		
North Dakota		x	x	x	x	x		x		x	x	x			x	x		
Ohio	x	x	x	x	x	x									x			
Oklahoma	x/Y	x	x	x	x	x			x	x	x	x			x	x		
Oregon	x		x	x	x	x				x		x		x	x			
Pennsylvania					x	x								x				
Rhode Island		x	x	x		x		x	x			x			x	x	x	
South Carolina		x-1																
South Dakota		x	x		x	x		x	x						x			
Tennessee																		
Texas		x	x			x		x	x						x	x		x
Utah	x	x	x	x	x	x		x		x	x	x		x	x	x	x	
Vermont	x										x						x	
Virginia																		
Washington		x	x	x	x	x			x	x	x	x	x	x	x	x	x	
West Virginia		x													x			
Wisconsin	x	x	x	x	x	x						x		x	x	x	x	
Wyoming																		

Tobacco Matrix Notes

Column I

x = State requires elementary and secondary schools to include instruction on the dangers associated with tobacco use as part of their health education programs.

Y = States have directed their departments of education to establish and implement in-service training programs to educate teachers, school administrators and other school personnel about the effects to tobacco use.

C = educational institutions providing teacher training must include instruction (i.e. classes, programs) on the effects of tobacco use.

* CT law provides that no certificate to teach or supervise shall be granted to any person who has not passed a satisfactory examination in the effects of tobacco and nicotine. (1984)
* FL's Cancer Control and Research Act provides that proven causes of cancer, including smoking, should be publicized and be the subject of educational programs for the prevention of cancer. (1985)
* IA law provides that students may be suspended or expelled for violation of rules prohibiting the use of tobacco. (1985)
* LA law provides that a school principal may suspend from school any pupil who uses tobacco in school buildings, on school grounds or on school buses owned by, contracted to, or jointly owned by any city or parish school board. (1985)

Columns 2-18

x = policy in place

Column 2

1 = School buses only.

Column 14

2 = Does not include department stores and malls.

Column 18

3 = Total ban on conveyances -- 75% of space in terminals designated as non-smoking areas.

Column 2 - Buses
Column 3 - Elevators
Column 4 - Government Buildings
Column 5 - Gyms/Arenas
Column 6 - Health Facilities
Column 7 - Hotels
Column 8 - Libraries
Column 9 - Museums
Column 10 - Meetings
Column 11 - Public Places
Column 12 - Restaurants
Column 13 - Restrooms
Column 14 - Retail/Grocery Store
Column 15 - Schools
Column 16 - Theaters
Column 17 - Workplace (private sector)
Column 18 - Intrastate Commercial Transit & Terminals

Source (Column 1): "Smoking and Health, A National Status Report," U.S. Dept. of Health and Human Services, Rockville, MD, 1986.

Source (Columns 2-18): "State Legislated Action on Clean Indoor Air, Cigarette Excise Taxes and Sale of Cigarettes to Minors," Tobacco-Free Young America Project, revised October 1987.

Asbestos Matrix

	1	2	3	4	5	6	7	8	9
Alabama	N	N *	N	N	Y				
Alaska	N(7)	N	N	Y (A)	Y	ALL	Y	Y	
Arizona	N(1)	N	N	N	Y	PU-S;PR-S;S-O	Y	Y	N
Arkansas	N	N	N	Y	Y	ALL			Y
California	N(1)	N	N	Y (B)	Y	ALL	Y	Y	Y
Colorado	N	PU-S;PR-S	N	Y (C)	Y	ALL		Y	N
Connecticut	PU-S(1)	PU-S *	Y	Y (C)	Y +	ALL	Y	Y	Y
Delaware	N(8)	PU-S;S-O *	Y	Y	Y	PU-S;S-O	Y	Y	Y
Florida	S-O	S-O	Y	Y (C)	Y	S-O			
Georgia	N	N	N	Y	Y	ALL	N	N	N
Hawaii	N	N	N	Y (C)	Y	ALL		Y	
Idaho	N	N	N	N	N	N/A	N/A	N/A	N/A
Illinois	PU-S;PR-S;S-0	PU-S;PR-S;S-O	Y	Y	Y	PU-S;PR-S	Y	Y	Y
Indiana	N	N *	N	N	Y	ALL	Y	Y	
Iowa	N	N	N	Y	Y	ALL	Y	Y	
Kansas	N	N	N	Y	Y	ALL	Y	Y	N
Kentucky	S-O	N	Y	Y	Y	ALL	Y	Y	Y
Louisiana	S-O	N	N	Y	Y	ALL			
Maine	PU-S;S-O	PU-S;S-O	Y	Y (C)	Y+	ALL	Y	Y	
Maryland	PU-S;(1)	N *	Y	Y	Y	ALL	Y	Y	Y
Massachusetts	PU-S;M;S-O	PU-S; S-O *	N	Y	Y	PU-S;PR-S;S-O;M	Y	Y	
Michigan	N	N	Y	Y	Y	ALL	Y	Y	
Minnesota	N	N	N	Y (C)	Y	ALL	Y	Y	Y
Mississippi	N	N	N	Y (B)	N	N/A	N/A	N/A	N/A
Missouri	PU-S;PR-S;S-O	PU-S;PR-S;S-O	Y	Y (D)	Y	ALL	Y	Y	
Montana	N	N	N	N	Y	ALL			
Nebraska	N	N	N	Y (C)	Y +	ALL	Y		
Nevada	N	N	N	N	N	N/A	N/A	N/A	N/A
New Hampshire	N (1)	N	N	Y	Y	ALL		Y	
New Jersey	PU-S;PR-S;S-O;(3)	PU-S;PR-S;S-O *	Y	Y	Y	PU-S;PR-S;S-O;(6)	Y	Y	Y
New Mexico	N (1)	N	N	Y (B)	Y	ALL	Y	Y	
New York	PU-S	N	Y	Y	Y	ALL	Y	Y	Y
North Carolina	N	N	N	N	Y	PU-S;PR-S;S-O	Y	Y	
North Dakota	N	N	N	Y (C)	Y	ALL		N	
Ohio	N (1)	N *	N	Y	Y	ALL	Y	Y	N
Oklahoma	PU-S;PR-S;S-O	N	PU-S;S-O	Y	Y	ALL	Y	Y	Y
Oregon	N	N	N	Y (C)	Y	ALL	Y	Y	Y
Pennsylvania	N	N	N	N	Y	ALL (7)	N	N	N
Rhode Island	PU-S;PR-S;S-O;(4)	PU-S;PR-S;S-O *	Y	Y	Y	ALL	Y	Y	N
South Carolina	PU-S;PR-S	N	Y	Y	Y	PU-S;PR-S;S-O;(8)	Y	Y	N
South Dakota	N	N	N	N	Y	ALL	N	N	N
Tennessee	N	N	N	Y (B)	Y	ALL (9)	N	N	N
Texas	N	N	N	Y (C)	Y +	ALL	Y	Y	
Utah	N(1)	N *	N	Y	Y	ALL	Y	Y	N
Vermont	S-O (7)	N *	N	Y	Y	ALL	Y	Y	N
Virginia	PU-S;PR-S;S-O;(5)	PU-S;PR-S;S-O *	Y	Y (C)	Y	ALL	Y	Y	N
Washington	N	N	Y	Y	Y	PU-S;PR-S;S-O(9)	Y	Y	Y
West Virginia	N (1)	N *	N	N	Y	ALL			
Wisconsin	N	N	N	Y	Y	ALL			
Wyoming	N	N	N	N	Y	ALL	Y	Y	

Asbestos Matrix Notes

Abbreviation Key
PU-S; public schools
PR-S; private schools
S-O; state-owned
M; municipal buildings
Y; state answered in the affirmative
N; state answered in the negative
N/A; not applicable
Where a space is blank, the state did not respond or information was not available.

Columns 2 and 3 refer to building management plans
Columns 5 through 9 refer to abatement standards.

Column 1 - State Required Inspections
Column 2 - State Required Management Plans
Column 3 - Reinspection/Surveillance Required
Column 4 - Accreditation Required
Column 5 - Standards Prescribed
Column 6 - Buildings Covered
Column 7 - Work Documentation/Recordkeeping
Column 8 - Worker Protection
Column 9 - Bonds/Insurance

Matrix Notes

(1) These states (AZ, CA, CT, MD, NH, NM, OH, UT, WV) are conducting inspections of state-owned buildings as a matter of policy rather than a statutory or regulatory mandate.

(2) NJ requires inspections in county and municipal buildings, and licensed child care and day care centers.

(3) VT and AK are conducting inspections of public and private schools as a matter of policy.

(4) DE is conducting inspections of public schools and state-owned buildings as a matter of policy.

(5) In addition, VA requires inspections in hospitals, child care centers, apartments to be converted into condominiums, and buildings to be renovated or demolished.

(6) In addition, RI requires inspections, management plans, and operations and maintenance plans in high-priority buildings (child inhabited), intermediate-priority buildings (essentially all buildings of public access), and buildings against which complaints have been lodged.

(7) Management plans for state-owned buildings are not required by statute or regulations in these states (AL, CT, IN, OH, UT, VT, WV); however, plans are being implemented as a matter of policy.

(8) In addition, NJ requires management plans and operations and maintenance plans for county and municipal buildings and licensed day and child care facilities.

(9) In DE and MD, management plans and operations and maintenance plans are being implemented in public school and state-owned buildings as a matter of policy.

(10) MA also requires management plans in municipal buildings. State approval is only required for schools.

(11) In addition, NJ abatement standards cover county and municipal buildings and licensed day care and child care centers.

(12) PA abatement standards are identical to federal standards and do not cover private residences or apartment buildings with 4 units or less.

(13) SC abatement standards do not apply to industrial buildings or owners of residential buildings with 4 units or less.

(14) TN abatement standards apply to renovations on demolitions in all industrial, institutional, and commercial buildings.

(15) In addition, WA abatement standards apply to certain industrial facilities.

(A) These states (CO, CT, FL, HI, ME, MN, NE, ND, OR, TX, VA) have passed legislation requiring accreditation, but rules and/or regulations implementing the program are not yet promulgated. Indicated provisions are anticipated.

(B) These states (CA, MS, NM, TN) require licensure which requires the individual or entity seeking licensure to show it has completed an EPA-approved training course. (CA-schools only)

(C) Missouri requires any person who undertakes as asbestos project (larger than NESHAP size) to "register" with the Dept. of Natural Resources. An acceptable registration requires the person to show employee training has been approved which meets the OSHA Hazard Communication Rule and the OSHA Construction Standard. These training requirements specify general areas which must be covered, but are not specific enough to lend themselves to inclusion within this chart.

(+) These states (CT, ME, NE, TX) require abatement standards to be followed by statute, but rules/regulations implementing the statute are not yet promulgated.

Asbestos II Matrix

	1	2	3	4	5	6	7	8
Alabama					Y	GF	GF;EPA	N
Alaska	Y	Y	Y	Y	N	N/A	GF;OSHA	N
Arizona	Y	N	Y	N	N	N/A	GF	N
Arkansas	Y		Y		Y	N/A	EPA	Y
California		Y	Y	Y	Y	GF	L;GF;OSHA	N
Colorado	Y	Y	N	Y	N	N/A	L	N
Connecticut	Y	Y	Y		N	B	GF;L	N
Delaware	Y	Y	Y		N	B;GF	GF	Y
Florida	Y	Y	Y	Y	Y	GF	L	N
Georgia	Y	Y	N					
Hawaii	Y	Y	Y		N	N/A		
Idaho	N/A	N/A	N/A	N/A	N	N/A		N
Illinois	Y	Y			Y	N/A	GF	Y
Indiana	Y	Y	Y		N	DB	GF;EPA	
Iowa	Y	Y	Y	Y	N	N/A	GF;L;F	N
Kansas	Y	Y	Y	N	N	N/A	L;EPA	N
Kentucky	Y	Y	Y		N	N/A	GF;EPA;OSHA	Y
Louisiana	Y	Y	Y		N	GF	EPA;L;F;GF	N
Maine	Y *	Y	Y	Y	Y	GF;B	EPA;L	N
Maryland	Y	Y	Y	Y	N	DB	GF	N
Massachusetts	Y	N	Y	Y	Y	GF	GF	
Michigan	Y	Y	Y	Y	N		GF;OSHA	
Minnesota	Y	Y	Y	Y	Y	N/A	GF;OSHA;EPA;L	Y
Mississippi					N	N/A		N
Missouri	Y	Y		Y	Y	N/A	EPA	
Montana	Y				N	N/A	GF;EPA	N
Nebraska	Y	Y			N	N/A	EPA;L	N
Nevada	N/A	N/A	N/A	N/A	N	N/A		N
New Hampshire	Y	Y	Y	Y	N	B	L	N
New Jersey	Y	Y	Y		Y	GF	GF	
New Mexico					N	N/A	EPA	N
New York	Y	Y			Y	DB	L;GF	
North Carolina	Y	Y			N	N/A		N
North Dakota	Y	Y	Y	Y	N	N/A	EPA	N
Ohio	Y	Y	Y		Y	GF	GF;L	
Oklahoma	Y		Y		N	N/A	GF;L	N
Oregon	N	Y	N	Y	N	N/A	EPA;L	N
Pennsylvania					N	N/A		
Rhode Island	Y	Y	N	Y	Y	B	GF;EPA	Y
South Carolina	Y	Y	Y		N	N/A	EPA	Y
South Dakota					N/A	N/A	EPA	N
Tennessee	Y	Y	Y	Y	N	GF	EPA	Y
Texas	Y *	Y	Y		N	N/A	L	N
Utah	Y	Y	Y	Y	N	N/A	L;GF;EPA	N
Vermont	Y	Y	Y		Y	N/A	GF;EPA;OSHA	
Virginia	Y	Y	Y	Y	N	SF	L;GF	Y
Washington	Y	Y	Y	Y	N	N/A	OSHA;WC	N
West Virginia	Y	Y			Y	GF	GF;EPA	
Wisconsin	Y	Y	Y	Y	N	N/A		N
Wyoming					N	N/A	OSHA;GF	

Asbestos II Matrix Notes

Abbreviation Key

Y; state answered in the affirmative
N; state answered in the negative
N/A; not applicable
Where a space is blank, the state did not respond or information was not available.

Matrix Notes

* Maine and Texas are currently promulgating enforcement standards, thus initial indications reported are subject to change.

B - Bond
DB - Department Budget
EPA - Environmental Protection Agency Grant
F - Fines
GF - General Fund
L - License and Permit Fees
LI - Line Item Appropriation
OSHA - Occupational Safety and Health Administration Grant
WC - Workers Compensation Program
SF - Special Fund

Columns 1 through 4 refer to enforcement of state regulations.

Column 1 - On-Site Inspections
Column 2 - Civil Fines
Column 3 - Criminal Penalties
Column 4 - Whistle-Blower Protection
Column 5 - State Funds for Non-State Buildings
Column 6 - Funding Source for State Buildings
Column 7 - Funding Source for Regulatory Programs
Column 8 - Liability or Insurance

Source for Asbestos Matrices I and II:
"State Asbestos Programs Related to the Asbestos Hazard Emergency Response Act, A Survey of State Laws and Regulations," Douglas Sacarto and Dennis Neilander, National Conference of State Legislatures, January 1988.

Radon Matrix

	1	2	3	4	5	6	7	8	9
Alabama	$75	FY87		2200	1985	19		8	Y
Alaska					1985	300	x		Y
Arizona	$58	FY88		FY88					N
Arkansas									N
California	$109	FY88,89			P-88				D
Colorado				900					Y
Connecticut	$400	FY88		1600	85-86	220		20	Y
Delaware	$10	FY88	1983, 1987		IP	500	x	4	N
Florida	$1,000	18 months	1984, 1986		IP	7000	x	n/s	Y
Georgia					1986	88			N
Hawaii									N
Idaho					1985	1000			D
Illinois	$130	FY88 pending			IP	2000		20	N
Indiana				FY88	IP	1000	x	Oct-50	D
Iowa	$123	FY88			1987	939		30	N
Kansas			1987	1000	1986	100		20	Y
Kentucky				900				20	N
Louisiana					P-88				N
Maine			1987		IP	1260*	x	4	Y
Maryland			1987		P			20-50	N
Massachusetts				FY88				20	Y
Michigan				500					Y
Minnesota				FY88	IP	5			Y
Mississippi									N
Missouri				FY88	IP	140			N
Montana								20	N
Nebraska			1987						Y
Nevada									N
New Hampshire	$105	18 months			1987		x		N
New Jersey	$4,340	FY87	1986		1986	6000	x	4-200	Y
New Mexico					IP	250		4	N
New York	$5,675*	FY87	1986, 87		IP	2401	x	20-200	Y
North Carolina					1986	535			Y
North Dakota				FY88	1986	100		8	Y
Ohio					1985	220		n/s	Y
Oklahoma									D
Oregon					1985	50			N
Pennsylvania	$5,300	FY87 +	1986, 87	FY88	85-86	21800	x	4--20	Y
					1985	2800		>20	
					IP	200			
Rhode Island				190			x		N
South Carolina					IP	300		4	N
South Dakota					V	20			N
Tennessee	$150	FY88	1987	1800					N
Texas									N
Utah	$38	FY88			1987				Y
Vermont					1984	30			Y
Virginia			1987		1987	800	x	4	Y
Washington	$50	FY87							Y
West Virginia					IP	12			N
Wisconsin	$25	FY87		1700				n/s	N
Wyoming				900				4	Y

Radon Matrix Notes

Column 1
Radon Specific Appropriation - Amount ($000's)
* = NY $5,675 - FY 87
$1,025 - 3 yrs or more
$1,167 - Indefinite

Column 2
Time Period for Expenditure (re: Column 1)
+ = FY 87 or longer

Column 3
Effective Date for Radon Enacted Legislation

Column 4
EPA 1987 Radon Survey - Number of Houses Tested
or Proposed date of next EPA Survey

Column 5
State Testing Programs - Date/Status of Program
P = Proposed
IP = In Progress
V = Volunteer

Column 6
State Testing Programs - Number of Houses Measured
* = 1260 - at cost testing program (charcoal canister)
4560 - at cost testing program (water)

Column 7
Free/Subsidized Testing by State (Excluding EPA/State Survey)

Column 8
Trigger Level (pCi/l) for State Activities Associated with Measurement
n/s = not specified

Column 9
State Information Materials Distributed
Y= Yes, N = No, D = Developing

Source: "EPA Summary of State Radon Programs," Office of Radiation Programs, Washington, D.C., August 1987.

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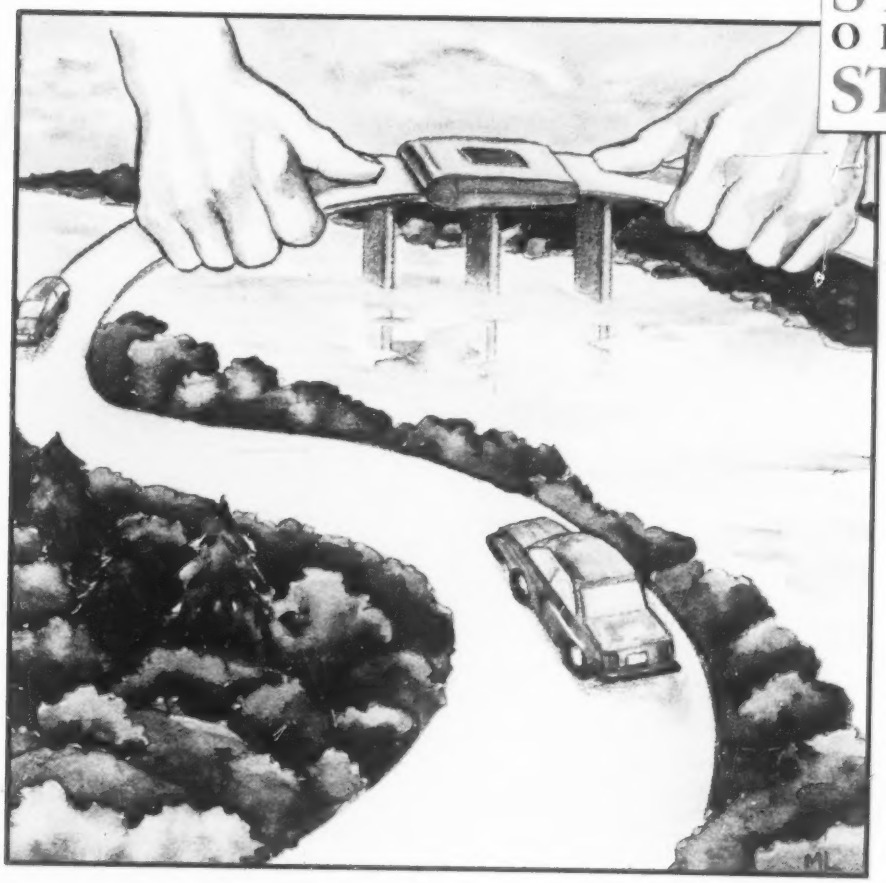

HIGHWAY SAFETY

5

FOCUS PAPER

RENEW AMERICA PROJECT

Prepared by:

Sheila Machado and Scott Ridley
The Renew America Project
May 1988

The Renew America Project is a non-profit, tax-exempt educational organization dedicated to the efficient use of all natural resources. The Project provides individual citizens, state agencies and private organizations with information to assist grassroots change to ensure a clean, safe and livable environment for future generations. For further information on the Renew America Project or to obtain additional copies of this report contact: Renew America, 1001 Connecticut Avenue, N.W., Suite 719, Washington, D.C. 20036, (202) 466-6880. See page 27 for ordering information.

Introduction

The purpose of the Highway Safety Focus Paper, one of six focus papers designed to supplement the data in the 1988 State of the States report, is to provide more detailed information on the status of highway safety programs and policies in the fifty states. It provides a national picture of safety efforts through maps, matrices, and explanation of key issues, and it allows comparison of the strength of state programs and policies. It is not intended to be a comprehensive assessment of highway transportation in each state, but an accurate measure of key legislation and programs that states have put in place to protect public health and safety on the nation's highways.

Although not traditionally considered an environmental issue, highways are one of our most dangerous daily environments. Beyond the direct factors that contributed to 47,800 deaths on the highways in 1985, motor vehicles cause a wide array of impacts. From the sprawl of suburbia to air pollution, the automobile is the machine with the greatest impact on our environment. How policymakers promote safe and efficient use of highways is an issue of growing urgency. For information beyond the scope of this report, please see the contact list on page 26.

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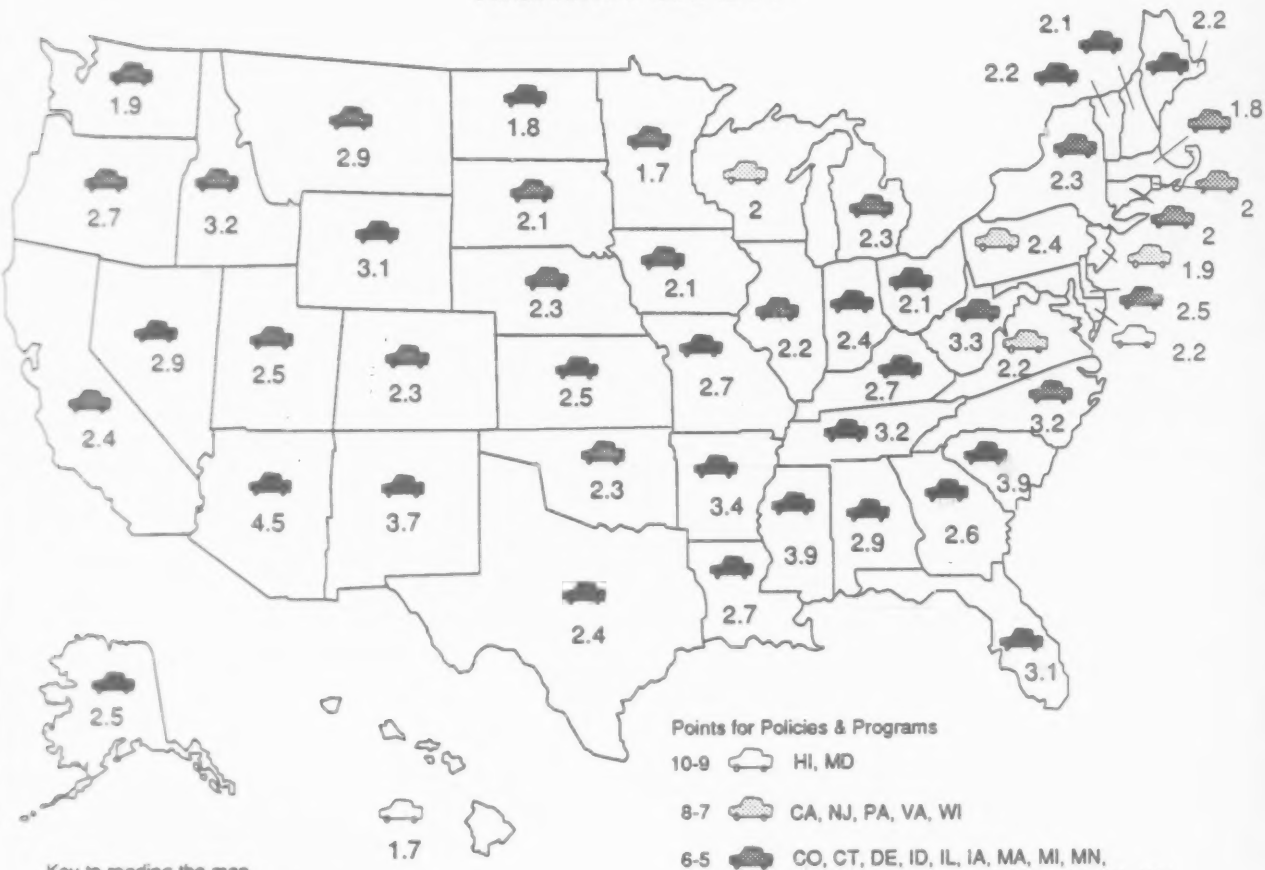
HIGHWAY SAFETY



Highway Safety

In April 1987, a new federal law allowed states to determine whether or not to raise speed limits to 65 miles per hour. New Mexico, a state with one of the nation's highest auto death rates, was the first to raise the speed limit on sections of its rural interstates. Thirty-eight other states followed. Initial figures from April to August 1987 show traffic deaths for those rural interstates in New Mexico more than doubled.1 An increase of more than 50 percent in the fatality rate occurred in 22 other states that raised their rural speed limit.

Although not traditionally considered an environmental issue, highways are one of our most dangerous daily environments. Auto accidents are recognized as the leading cause of death for Americans under the age of 35. More than 47,800 people were killed in traffic accidents in 1985. Another 300,000 were injured.

The automobile is also the machine with the single greatest impact on our environment. It helped give birth to the sprawl of suburbia. It has laced our cities and countryside with nearly four million miles of roads. It accounts for more than half of our total petroleum use each year. And its exhaust has laden the air with carbon monoxide, lead, sulphur dioxide, benzene, and other chemicals hazardous to human health.

How policymakers promote safe and efficient use of highway transportation is an issue of growing urgency. In addition to a rising death rate on the roads, 40 percent of the nation's bridges are in poor condition. More than a million miles of roads will need resurfacing by the year 2000. Travel on urban freeways is expected to increase by nearly 50 percent over the next 20 years, increasing the amount of time and fuel and user costs wasted in traffic jams by 400 percent. Sixty-two major cities have ozone pollution levels violating federal standards. And while fuel efficiency has increased from an average of 13 miles per gallon in 1978 to 18 miles per gallon today, standards for new cars have been frozen. The result is not only unnecessary fuel consumption and increased air pollution, but pressures to import more oil and to drill in environmentally sensitive areas such as the Arctic National Wildlife Refuge.

Maintaining the Interstate Highway System

The nation's modern highway system began in the 1940s with a grand plan called the System of Interregional Highways, later changed to the Interstate Highway System. The conventional wisdom of the 1940s and 1950s called for a pattern of radial routes around cities with a ring road at the urban fringe around which jobs and development flourished.

The development of the system was supported by the Federal Highway Trust Fund passed in 1956. The law placed a federal tax on gasoline and channelled the funds into a federal-state cost sharing program.

As the Interstate highway system expanded in the 1960s and 1970s and the number of cars and trucks on the road multiplied, Congress passed more laws to address transportation issues: the Urban Mass Transportation Act in 1964, the Clean Air Act in 1965, the Highway Safety Act in 1966, the National Environmental Policy Act in 1969, and the Hazardous Materials Transportation Act in 1975. Like the Highway Trust Fund and most federal laws, they included partnership arrangements with the states. But it was a partnership in which the federal government played the dominant role.

Today, the federal-state partnership is changing. The federal government is withholding funds from the Highway Trust Fund on many projects because of federal deficit concerns. And the states are taking on increased responsibilities for air pollution controls, hazardous material transport, mass transportation, and urban congestion.

The shift is coming at a time when costs of repairing and maintaining roads are expected to increase. Many roads are now 25 to 50 years old and were not built to withstand current loads. Agricultural and forestry traffic put a heavy load on rural roads together with the increased weight of commercial vehicles. Experts say a road with a life expectancy of 20 years may be cut by 25 percent due to heavier truck weights. Mountain states report that steel-studded snow tires add to the rutting problems caused by big trucks. More than one mile out of every 10 of the 43,593 mile Interstate system is in poor condition. 2

There is nearly $10 million in the Highway Trust Fund that is out of reach for state use. Because of federal accounting procedures, spending the money would increase the national deficit, even though the Trust Fund itself (financed by federal gas tax revenues) is in the black. The Tax Reform Act of 1986 imposed severe restrictions on tax-exempt financing for infrastructure facilities. Federal revenue sharing, which many

localities used for road and bridge repairs, was also eliminated in 1986.

Public highways are financed in three ways: systemwide user fees (taxes on motor fuels); project-specific fees (tolls); and by general tax revenues. Users support about 95 percent of federal highway spending by paying excise taxes that go into the Highway Trust Fund. About 80 percent of state highway spending comes from user fees also, primarily state levied fuel taxes and vehicle registration fees. Many states facing serious fiscal restraints have raised user taxes and are seeking additional revenue raising mechanisms.

Kansas has the most significant problem, with 67.7 percent of its rural Interstates considered deficient, and 63.1 percent of urban Interstates in poor condition as well. Also high in deficient Interstate roads are Rhode Island, Missouri, New Mexico, and Oregon. Washington state, Maryland, and North Carolina are among the states with the lowest percentage of deficient Interstate roads. 3

The condition of roads is a primary factor in auto safety. An additional concern is the number of bridges needing repair. Like the Interstate highway system, many bridges are more than 25 years old. Out of a total of 575,607 bridges nationwide, 131,562 are considered structurally deficient and 112,084 are functionally obsolete. In Connecticut, Kentucky, Missouri, and Montana, more than 60 percent of the bridges have been neglected. New York has the highest proportion—67.4 percent. It is estimated that it will take more than $50 billion to conduct the necessary repairs on all of the bridges in poor condition.4 With traditional federal revenue sharing that many localities used for road and bridge repair coming to an end, state and local governments will now have to consider tax increases, and in many areas repair of roads and bridges is likely to be delayed.

Speed Limits and Seat Belts

For many states the issue of general road conditions increases the risk in raising speed limits. Five states that raised their speed limits in 1987 had more than one third of their urban or rural interstates in poor condition.

In 1974 maximum speed limits of 55 miles per hour were introduced in every state following a federal ban on highway project assistance to states with higher speed limits. The primary purpose was to conserve fuel, but analysts at the National Safety Council believe the measure was responsible for saving 2,000 to 4,000 lives each year. 5 The March 1987 federal law allowing states to raise rural speed limits up to 65 miles per hour and the subsequent rise in the death rate are particularly ironic for state officials who argued that higher speed limits are more efficient for truckers and travelers. Also ironic is the fact that under the new law there are no federal sanctions on states to enforce a speed limit set at 65 miles per hour. But states keeping a 55 mile-per-hour speed limit established under the 1974 law must show at least 50 percent compliance or risk losing federal funds.

Use of seat belts is also an important issue for states. Although many countries have had national seat belt laws since the early 1970s, the U. S. has left the issue to the states. In 1984, New York became the first of 27 states to pass a seat belt law. Within six months, New York traffic fatalities dropped 28 percent with a belt usage rate estimated at 57 percent. Currently, safety belt use in states that have passed use laws is estimated to average about 45 percent. The figures for use vary widely, from 78 percent in North Carolina to 23 percent in Kansas. The National Highway Traffic Administration estimates that in 1986, use of seat belts prevented 1,450 deaths and 20,000 critical injuries. Department of Transportation rules will soon require 40 percent of all new cars to have automatic restraint systems. It is estimated that if everyone in automobiles buckled up it would save 10,000 lives annually.

Vehicles associated with high death rates, including pickup trucks and jeep-like vehicles, are more popular in rural areas and may account for higher rural death rates. High driving speeds, lower seat belt use, and reduced access to emergency care are also factors contributing to higher accident fatality rates in rural areas.

Drunk Driving

Drunk driving is another significant issue. More than half the drivers killed each year have blood alcohol concentrations higher than the legal limit. But many states test less than 80 percent of drivers killed and under-reporting by states is commonplace. As of January 1987, 45 states had laws pertaining to blood alcohol content to define driving under the influence. In 20 states, arrest for alcohol-related driving violations can result in automatic loss of a driver license independent of the outcome of criminal charges. California, Colorado, Hawaii, and Utah have the toughest regulations for drunk driving. Alabama, Alaska, Florida, Georgia, Louisiana, Missouri, and Texas have the weakest.

Air Pollution

Beyond these direct factors that contributed to the 47,800 deaths on the highways, motor vehicles carry a wide array of impacts on public health. Motor vehicles contribute an estimated 50 percent to air pollution. Prolonged or periodic exposure to toxic chemicals can damage heart, lung, and brain tissue and, in the case of carbon monoxide, cause death.

The first federal air pollution law was passed in 1955. Although limited in scope, it designated the Department of Health, Education and Welfare to research and provide technical support to state and local air pollution programs. The 1963 Clean Air Act was the first general federal provision relating to the abatement and control of air pollution. Based on early programs in California, crankcase controls to reduce hydrocarbon emissions were installed starting in 1963. It was not until the amendments to the Clean Air Act in 1965 that the Department of Health, Education and Welfare was authorized to prescribe national standards for emissions from new motor vehicles which caused or contributed to air pollution.

Later amendments continued to update the requirements. The 1967 Air Quality Act superceded earlier legislation and set the federal government in an active role. The Act specifically set forth the intention of Congress to preempt the control of emissions from new motor vehicles. The 1967 Act prohibited the removal of control devices prior to sale, and the manufacture, import, sale of a new vehicle not in conformance with the Act was also prohibited.

Exhaust controls were introduced nationwide in 1968 models, to reduce carbon monoxide. And the 1970 amendments set standards and required that hydrocarbon and carbon monoxide emissions be reduced 90 percent by 1975. Improved nitrogen oxide control systems were placed on all cars after 1973, and in 1975 catalyst or equivalent control systems were introduced to meet tougher emission standards and save fuel. By 1976 nitrogen oxide emissions were to be reduced by 90 percent from the 1970 level. The 1970 amendments were unique in that there was no other instance on record of standard-setting in anticipation of the development of technology to render the standard meaningful. The law anticipated, or forced, the development of auto pollution technology.

Legislation and technological improvements had a measurable impact. Between 1975 and 1984, according to EPA, the level of lead in the air decreased by 70 percent at 36 urban sites. Carbon monoxide declined 34 percent during the same period. And ozone declined 17 percent from 1975 to 1983 and remained level in 1984.

But despite this progress problems continue. Many states with cities violating air pollution standards require no periodic inspection of motor vehicles. Monitoring for air pollution is also being reduced in many areas. And 62 major cities with excessive ozone pollution have no chance of meeting federal air standards by the end of 1988.

According to EPA, it may take another 15 years for Los Angeles, 10 years for New York City, and five years for Atlanta to meet standards. EPA first threatened sanctions against the violating states, but has since retreated, allowing cities to develop their own standards and schedules with a requirement that they reduce the excessive level of toxic pollutants by three percent per year.

Fuel Consumption

Some states, feeling pressure to reduce air pollution, have turned to alcohol fuels—methanol and ethanol—to help reduce exhaust emissions. Colorado became the first state to require city motorists to use 10 percent alcohol-blended gasoline during winter months. California is moving ahead to use pure methanol in its state vehicle fleet, and legislation in Arizona has proposed use of alcohol fuels in state fleets.

One policy with great potential impact on fuel consumption is the setting of fuel efficiency standards for new cars and trucks. In 1985 the transportation sector accounted for 62.6 percent of the total use of refined petroleum products — a 7.8 percent increase from 1975 figures. Neither residential, commercial, nor the industrial sector consume the amount of petroleum that transportation does. Of the refined petroleum used by the transportation sector, the majority of 1985 consumption (43.4 percent) was motor gasoline. Energy consumption by the transportation sector has been increasing at an average annual rate of 1.5 percent since 1970, making it the fastest growing sector in energy use.

As is well known, fuel efficiencies of 40 miles per gallon are possible. The corporate automobile fuel efficiency law passed by Congress has helped push the average fuel efficiency for U.S. cars from 13 miles per gallon to an average of 18 miles per gallon. The law established 27.5 miles per gallon as a target. However, the Reagan administration rolled back the standard to 26 miles per gallon. Increasing the average efficiency of the U.S. fleet to 19 miles per gallon is estimated to be equivalent to more than 130 million barrels of

Public Hazardous Materials Respose Teams

▲ - County response teams
● - City/town response teams

SOURCE: International Association of Fire Chiefs (IAFC) survey and OTA Staff.

The Chemical Plants: Where They Are

SOURCES: Environmental Protection Agency, SPN Directory of Chemical Producers, Chemical Week Buyers Guide, Chemsources U.S.A., individual chemical companies.

oil per year, an amount greater than the anticipated production of new wells proposed for the Arctic National Wildlife Refuge.

Other methods of reducing pollution and fuel consumption are mass transit, car-pooling, and van-pooling. Commuting to work is the most typical use of cars, consuming 34 percent of daily automotive fuel. For the routine roundtrip commute trip, Americans use about 1.8 million barrels of motor fuel each working day. In 1987, 110 million Americans commuted to work in some type of public or private mode of transportation: 21.7 million used car pools or van pools, 4.5 million rode buses, 2.3 million used rail transit, and 70.8 million drove back and forth to work alone.6

Land use, development patterns, consumer incomes and choices are a few indicators of the increasing dependence on the automobile. Once almost solely residential, many suburbs have become major centers of employment. The number of people who commute to a suburb has grown twice as fast as the number who commute to a central city. Two-thirds of all jobs created between 1960 and 1980 were in suburbs, a shift that has brought a corresponding change in commuting patterns. Nationally the number of cars is growing twice as fast as the number of people. Motorists are also traveling twice as many miles per person as they did in 1960. In 1975, two in five urban interstates were congested at rush hour. Ten years later, it was three in five. Urban highway travel is up 15 percent since 1983 and total highway travel is up 13 percent. There are no national plans to handle this increasing traffic.

In order to reduce traffic, incentives for ridesharing, high-occupancy-vehicle (HOV) bypass lanes are utilized in six states. Some 124 miles of HOV lanes are operating nationwide, with another 129 planned to be open by 1989.

Car-pooling and van-pooling are usually coordinated independently or by the employer. Mass transit is either a public service operated by a city or private enterprise. The city of Portland, Oregon, has developed an especially good model in offering free mass transit within the city—funded by a tax on employment in the city.

Hazardous Materials

Another broad highway environment issue concerns the transportation of hazardous material. The Hazardous Materials Transportation Act (HMTA) of 1974 defines a hazardous material as "a substance of material in a quantity and form which may pose an unreasonable risk to health and safety or property." These include: industrial chemical products (phosphorous, etc.); the full range of petroleum products (gasoline, diesel fuel, etc.); products used in the home, such as paint and ammonia cleaners; and radioactive materials. The intent of the HMTA is two-fold; to enhance safety and to avoid conflicting with local ordinances. It does not preempt state regulations and allows state and local regulations which are in harmony with the Act.

EPA estimates that about 20,000 new compounds are given toxic designations annually. The importance of classification of chemicals can be illustrated by the release of methyl isocyanate in Bhopal, India. This substance had been classified as flammable by the U.S. Department of Transportation (DOT); after the incident it was quickly reclassified as a toxic inhalant.

Hazardous materials are being transported through the nation's cities, towns, and neighborhoods over highways which transect densely populated areas. Existing highway routing policies established by DOT permit state and local governments to designate hazardous material routing to accomodate local traffic conditions. Although DOT advises state and local officials to use explicit safety criteria and involve affected parties in route designation, consensus at the local and state level is often difficult. Jurisdictional problems and lack of emergency response units makes route establishment a complex issue.

Truck transport, by a fleet of 467,000 trucks, accounts for more than half of all hazardous materials shipments, or about 927 million tons per year. Differing federal, state, and local regulation and enforcement procedures do not allow citizens to obtain adequate information on these shipments. And officials responsible for responding to accidents often lack training and accurate information.

Although some companies and private contractors employ emergency response experts, public response teams are vitally important. Firemen and police are usually the first on the scene of an accident and often have primary responsibility. In 1980, a fire chief in Somerville, Massachusetts received conflicting advice from 30 government and industry experts. When water was finally sprayed on a ruptured tank car, an acid cloud was released forcing the evacuation of 30,000 people.7

Local and state police or firefighters are usually the first to arrive at the scene of a hazardous materials accident. The National Fire Academy reports that there are approximately 1.2 million firefighters nationwide; 85 percent are volunteers and

Highway Safety Main Matrix

	1	2	3	4	5	6	7	8	9	10	11
Alabama	1,081	2.9	41	N	65	N	.3/0	47.7	0	0/2/0/4	.08/.02
Alaska	101	2.5	14	N	55	N/C	29.1/52.4	11.2	0	0/0/0/0	0/0
Arizona	1,004	4.5	30	N	65	B/C	4.7/15.3	7.2	2	-	5.76/.16
Arkansas	602	3.4	23/X+	N	65	P	3.3/7.3	48	1	1/2/-/4	.13/.02
California	5,253	2.4	105	Y/P/2	65	R/C	4.9/7.8	26	4	1/2/3/4	25.62/.14
Colorado	603	2.3	44/X	Y/P/2	65	B/C	7.8/2.5	36.3	2	1/2/-/4	28.06/.41
Connecticut	450	2	26	Y/P/1	55	P/S	0/.9	63.2	1	*/0/0/4	37.53/.80
Delaware	136	2.5	8/P	N	55	P/C	NA/O	19.2	1	1/2/3/4	10.88/.28
Florida	2,831	3.1	58	Y/P/2	65	N	4.1/0	23.3	0	1/2/3/4	.85/.02
Georgia	1,530	2.6	59/X+	N	55	B/C	0/0	43.7	0	1/0/3/4	25.67/.28
Hawaii	120	1.7	2	Y/P/1	55	P	0/0	27.3	4	0/2/0/4	0/0
Idaho	258	3.2	11	Y/P/2	65	B/C	14.4/12.7	29.3	2	0/2/3/0	0/0
Illinois	1,596	2.2	91/X	Y/P/2	65	L/C	4.3/11.6	31	2	1/2/-/4	14.66/.05
Indiana	1,038	2.4	66	Y/P/2	65	B/C	8.2/4.5	51.2	1	-/2/-/-	2.37/.08
Iowa	441	2.1	22	Y/P/1	65	L	3.1/7.8	49.3	3	1/2/-/4	.83/.08
Kansas	500	2.5	38	Y/P/2	65	R	67.7/63.1	52.2	2	0/0/0/4	0/0
Kentucky	805	2.7	34	N	65	R/C	3.3/12.5	62.1	2	0/0/3/4	.21/.01
Louisiana	932	2.7	69/X	Y/P/2	65	P/C	1.4/4.0	46.4	0	0/2/0/0	0/0
Maine	212	2.2	10/X	N	65	P	7.3/10.8	30.4	2	1/2/0/4	1.50/1.08
Maryland	784	2.2	46/P+	Y/P/2	55	L/C	O/.9	35.7	3	1/2/3/4	12.15/.14
Massachusetts	749	1.8	29/X	N	55	P/S	3.5/1.8	34.7	2	0/2/3/4	55.31/.31
Michigan	1,594	2.3	32/P+	Y/P/2	65	R/C	27/22.4	29.1	2	1/*/0/4	10.81/.23
Minnesota	571	1.7	29	Y/1	65	R	5/5.9	29.2	3	-	5.86/.08
Mississippi	771	3.9	23	N	65	P	28.4/35.8	54.1	1	-	0/0
Missouri	1,129	2.7	59	Y/P/2	65	P/C	34/25.5	63.3	0	1/2/0/4	0/0
Montana	222	2.9	18	Y/P/2	65	N	6.1/4.3	60.2	3	1/0/3/0	.09/.05
Nebraska	290	2.3	15	N	65	N	9.5/2.7	59.2	2	1/2/0/4	.88/.04
Nevada	233	2.9	15	Y/P/2	65	L/C	10.3/0	16.1	2	-/-/3/4	0/0
New Hampshire	172	2.1	7/+	N	65	P/C	0/0	46.2	2	-	0/0
New Jersey	1,039	1.9	49/P+	Y/P/2	55	P/S	10.1/7	35.2	2	1/2/0/4	39.46/.08
New Mexico	499	3.7	13	Y/P/1	65	L/C	36/22.7	17.8	1	0/2/0/4	0/0
New York	2,115	2.3	77/P+	Y/P/1	65	P/C	4.1/6.8	67.4	2	1/2/0/4	55.79/.08
North Carolina	1,647	3.2	36	Y/P/1	65	P/C	1.8/4	56.8	3	1/2/0/4	.16/.02
North Dakota	100	1.8	19	N	65	N	0/0	53	3	0/2/0/0	0/0
Ohio	1,673	2.1	98	Y/P/2	65	R/C	4/21.9	21.3	1	0/2/0/4	2.84/.04
Oklahoma	698	2.3	40	Y/P/2	65	P/C	17.3/25	56.1	2	0/0/3/4	.27/.02
Oregon	619	2.7	23/+	Y/P/1*	65	R/C	34.6/26.5	18.4	3	0/0/0/4	3.43/.05
Pennsylvania	1,894	2.4	123	Y/P/2	55	P/C	17.9/11.9	35.5	3	1/2/0/4	19.12/.13
Rhode Island	124	2	5/X	N	55	P/S	57.1/28.6	21.5	2	0/2/0/4	8.99/.06
South Carolina	1,059	3.9	19	N	65	P	3.9/2.7	20.6	3	1/2/0/4	.32/.09
South Dakota	134	2.1	2	N	65	B	0/0	48.4	2	0/2/3/4	0/0
Tennessee	1,230	3.2	32	Y/P/2	65	N/C	9.5/0	46.1	2	-	1.58/.06
Texas	3,567	2.4	147	Y/P/1	65	P/C	5.2/17.4	35.1	0	0/2/0/4	.59/.01
Utah	313	2.5	25	Y/P/2	65	P/C	6.8/.8	14.6	4	-	13.93/.28
Vermont	109	2.2	7	N	65	P	9.7/20	43.5	2	1/2/3/4	.49/.04
Virginia	1,126	2.2	45/X	Y/P/2	55	P/C	6.3/8.4	32.5	2	1/2/0/4	9.23/.36
Washington	703	1.9	26	Y/P/2	65	R/C	0/1.7	27.3	4	0/2/-/4	17.33/.11
West Virginia	440	3.3	20	N	65	P	6.4/7.8	59.6	3	-	.22/.02
Wisconsin	747	2	32	Y/P/2	65	L/C	23.2/25	46.1	3	1/2/3/4	9.08/.18
Wyoming	168	3.1	43	N	65	N	0/4	24.7	1	0/0/0/4	0/0

See page 24 for a key to the Columns.

the remaining 15 percent are paid employees of municipal, state, local, or county governments. With 20,000 new chemicals being designated hazardous or toxic each year, fire and safety officials are confronted with the on-going problem of maintaining and training personnel to handle emergency situations. Lack of training, weak enforcement procedures, faulty vehicles, lack of equipment and inadequate information are a few of the problems that state and local officials must overcome in developing hazardous materials transportation policies.

A few states, such as California, Illinois, New Mexico, South Carolina, and Washington have developed stiffer requirements for waste shippers. But local public response teams and further development and integration of regulations are needed at both the federal and state levels.

As general revenue sharing and other federal grant-in-aid programs are reduced under the philosophy of "new federalism" and deficit reduction, maintaining the safety and quality of transportation will be increasingly difficult. Local governments suffered a loss in revenue of $4 billion a year when general revenue sharing was eliminated in 1986. New federalism advances the belief that safety on the highways is a decision to be made by individuals and states. This ignores the interstate nature of highways and the fact that even the most responsible driver can be threatened by hazardous materials accidents, poor road conditions, or drunk drivers.

Resurfacing a million miles of roads by the year 2000, repairing nearly 250,000 bridges, assuring access to mass transportation, encouraging greater fuel efficiency; and undertaking new safety initiatives for speed limits, seat belt laws, drunk driving, hazardous material transport, and air pollution reduction programs are institutional problems. Perhaps more than any other issue these problems will require a renewed federal commitment and strengthening of the federal-state partnership.

Some of the key efforts states are undertaking are indicated in the following matrices. If traditional patterns hold, increased activity at the state level will help to spur new federal action as well.

MATRIX KEY

1. Total Highway Fatalities: 1986 preliminary highway fatalities.

2. Fatalities per 100 million Vehicle Miles Traveled: 1986 preliminary data.

3. Accidents Involving Hazardous Materials/Notification Requirements: "X"—requires advance notification for transport of hazardous wastes, "+"—notification of additional hazardous materials, "P"—certain areas of the state require notification.

4. Seat Belt Laws/Penalties/Enforcement: "Y"—has seat belt law, "N"—no law, "P"—penalty/fine for violation of law. "1"—primary enforcement of law, "2"—secondary enforcement (must be stopped for another offense to be cited for seat belt violation.)

5. Speed Limits: 65 mph or 55 mph speed limit for rural interstates.

6. Motor Vehicle Inspection: "P"—periodic inspection, "R"—random , "B"—periodic inspection of school buses only, "L"—limited , "N"—no program, "S"—statewide maintenance program, "C"—selected city/county programs.

7. Percent Deficient Rural Interstate Mileage/Percent Deficient Urban Interstate Mileage: 1985 figures.

8. Percent Deficient Bridges: December 1986 DOT figures.

9. Drunk Driving Laws: scale of 0-4 indicates extent of regulatory provisions (open-container, mandatory fine for first offense, etc.).

10. Coordination of Rural Mass Transit Programs: "1"—has legislative or executive order ("*"—pending), "2"—has interagency committee or task force, "3"—interagency agreement, "4"—technical assistance (state to local gov.).

11. Mass Transit Expenditure (per capita)/Per Mile of Transit: 1987 Council of State Legislatures data.

For sources, see page 24.

The Final Scores

	Highway Safety Points	Total Points	Overall Ranking
Massachusetts	6	45	1
Wisconsin	7	45	
California	7	44	3
New Jersey	7	44	
Connecticut	6	43	5
New York	6	42	6
Oregon	6	42	
Florida	4	41	8
North Carolina	5	40	9
Hawaii	9	38	10
Michigan	6	38	
Minnesota	6	38	
New Hampshire	3	38	
Rhode Island	5	37	14
Maine	4	36	15
Vermont	4	36	
Maryland	**10***	**35**	**17**
Iowa	6	34	18
Virginia	8	34	
Delaware	6	32	20
Washington	6	32	
Nebraska	5	31	22
Pennsylvania	8	31	
Ohio	4	30	24
Colorado	6	29	25
Illinois	6	29	
Montana	5	29	
Utah	5	29	
Indiana	3	28	29
Georgia	4	27	30
South Dakota	5	27	
North Dakota	4	26	32
West Virginia	5	26	
Arizona	1	25	34
Idaho	5	25	
Kansas	3	25	
South Carolina	2	24	37
Kentucky	4	23	38
Missouri	4	23	
New Mexico	2	22	40
Alabama	2	21	41
Alaska	2	21	
Louisiana	2	20	43
Tennessee	2	20	
Nevada	2	19	45
Oklahoma	5	19	
Texas	2	19	
Arkansas	2	17	48
Mississippi	1	17	
Wyoming	2	15	50

Key:

Highway Safety Points are based on a scale of 1 to 10. The points were derived from the data in the matrices and measure the strength of state programs and policies to protect the environment. See "Ranking Notes" on page 11 for detailed explanation.

Total Points consist of a maximum score of 60 points. Each of the six topics in the 1988 main report have a maximum value of 10 points. (The six topics are: Highway Safety, Indoor Pollution, Surface Water Protection, Reducing Pesticide Contamination, Land Use Planning, and Energy Pollution Control.) The point values for each topic are added together to give the state's total point score.

Overall Ranking is the ranking of the states based on the total points received for all six topics. In the case of a tie each state is given the same ranking. Example: Both Massachusetts and Wisconsin received 45 total points and tied for first place.

Summary Example: With 38 points, Hawaii ranks 10th in the nation for the strength of state environmental programs examined. For highway safety, Hawaii received nine points on a 10 point scale. The nine points received for highway safety were added together with the points received for the remaining five topics to equal the total point score of 38.

* **Maryland** was judged to have the strongest programs and policies for highway safety and received 10 points (see Highway Safety Snapshot).

Highway Safety Snapshot

Maryland represents consistently good quality for most of the indicators assessed for highway safety. The state Secretary of Transportation oversees a budget of $1.5 billion drawn from tolls, bonds, motor fuel taxes, a portion of the state corporate income tax, and several other sources. The department is divided into seven separate administrations: State Highways, Motor Vehicles, Maryland Port Authority, Maryland Transportation Authority, Mass Transit Administration, and State Rail Administration. The State Highway Division receives nearly three quarters of the total budget. This is reflected in the fact that there was no deficiency in rural interstate mileage, which totals about 150 miles. And less than one percent of urban interstate miles are deficient, an overall record of some of the best highway maintenance in the country. However, 35.7 percent of the state's bridges are structurally deficient or functionally obsolete, slightly less than the national average of approximately 40 percent.

Maryland requires advance notification on transport of hazardous materials in certain areas. The state has a seat belt law and has maintained its 55 mile per hour speed limit on the rural interstate. Its drunk driving laws are in the upper third in comparison to other states, and the state has declared an intent to lower the threshold for blood alcohol content levels, an area in which it has been lagging. It has some of the best integrated structure for rural mass transit and spends approximately $.14 per mile of transit.

Its highway fatality rate for 1986 is 2.2 persons per 100 million vehicle miles traveled.

Currently:

- seven states have highway fatality rates below two persons per 100 million vehicle miles traveled;
- nine states require notification on transport of a wide range of hazardous materials;
- 30 states require the use of seat belts;
- 11 states have maintained speed limits at 55 miles per hour;
- eight states have 25 percent or more of rural Interstate highway miles in poor condition;
- eight states have 25 percent or more of urban Interstate highway miles in poor condition;
- 23 states have 40 percent or more of their bridges in poor condition;
- four states have the most extensive drunk driving laws.

Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring, enforcement, and indications of progress. Although programs mandated by state legislatures, rather than innovative projects, are given greater weight, attention is given to assure that states have not simply "papered-over" a problem with new legislation.

The evaluation is both comparative and subjective and is not intended to represent an absolute scale in which the top state is doing everything possible to protect the environment on a given topic. Research material and data on which the rankings are based are drawn from a variety of sources: individual telephone and mail surveys of the states; information filed by the states with federal agencies; studies and surveys conducted by academic institutions, private contractors, and national environmental organizations; and information from peer reviewers. In each case, we have utilized what we believe to be the best data available.

The primary indicators for highway safety policies and programs were: state fatality rates, the number of accidents and policies regarding hazardous materials tranport, seat belt laws and enforcement penalties, speed limits, requirements for motor vehicle inspections, the percentage of rural and urban interstate highway miles in poor condition, the percentage of bridges needing repair, drunk-driving laws, integration of rural mass transportation policies, and spending per mile and per capita on mass transportation.

Examination of safety-oriented policies and road and bridge conditions were measured as part of fundamental highway safety. The fatality rate was viewed as a collective result of and indication of the need for safety provisions. Policies and spending on mass transportation (based on relative need) was a final consideration to raise or lower a state's ranking.

1985 Fatalities Matrix

	1	2	3	4	5	6
Alabama	881	2.5	35.80	17.10	776	88.10
Alaska	127	3.3	42.30	0.20	107	84.20
Arizona	893	4.1	38.40	7.80	782	87.60
Arkansas	535	3.1	31.00	10.10	452	84.50
California	4,961	2.4	28.40	31.30	4,448	89.70
Colorado	578	2.2	25.30	5.50	525	90.80
Connecticut	448	2.0	19.40	89.40	421	94.00
Delaware	104	1.9	23.20	50.60	94	90.40
Florida	2,830	3.2	35.30	48.30	2,543	89.90
Georgia	1,361	2.5	34.80	23.10	1,223	89.90
Hawaii	126	1.9	21.20	19.50	118	93.60
Idaho	255	3.3	36.80	3.10	218	85.50
Illinois	1,535	2.2	22.10	27.20	1,365	88.90
Indiana	974	2.4	27.10	26.80	880	90.30
Iowa	474	2.3	24.90	8.40	416	87.80
Kansas	486	2.5	29.40	5.90	429	88.30
Kentucky	712	2.5	31.70	17.60	624	87.60
Louisiana	931	2.8	33.80	19.20	824	88.50
Maine	206	2.2	25.60	6.20	189	91.70
Maryland	727	2.2	25.00	68.70	655	90.10
Massachusetts	740	1.9	19.50	39.60	686	92.70
Michigan	1,543	2.3	24.70	26.50	1,386	89.80
Minnesota	609	1.9	24.60	7.20	537	88.20
Mississippi	662	3.5	36.60	13.90	582	87.90
Missouri	931	2.4	27.40	13.40	827	88.80
Montana	223	2.9	38.30	1.50	194	87.00
Nebraska	237	2.0	21.70	3.10	207	87.30
Nevada	258	3.4	36.90	2.30	226	87.60
New Hampshire	1,788	2.5	25.50	20.20	177	94.10
New Jersey	959	1.8	16.60	122.40	880	91.80
New Mexico	535	4.0	54.70	4.40	453	84.70
New York	2,003	2.2	20.40	40.30	1,849	92.30
North Carolina	1,481	3.0	35.90	28.20	1,331	89.90
North Dakota	90	1.7	20.30	1.30	77	85.60
Ohio	1,640	2.2	22.40	39.80	1,475	89.90
Oklahoma	739	2.4	32.90	10.60	650	88.00
Oregon	559	2.6	28.50	5.80	510	91.20
Pennsylvania	1,771	2.3	23.40	39.10	1,580	89.20
Rhode Island	109	1.9	17.60	89.80	99	90.80
South Carolina	952	3.6	44.70	30.70	848	89.10
South Dakota	130	2.1	26.90	1.70	109	83.80
Tennessee	1,101	3.0	36.40	26.10	997	90.60
Texas	3,678	2.6	34.00	13.80	3,267	88.80
Utah	303	2.5	31.50	3.60	270	89.10
Vermont	115	2.5	29.90	12.00	101	87.80
Virginia	977	2.0	25.70	23.90	895	91.60
Washington	742	2.2	24.90	10.90	643	86.70
West Virginia	420	3.3	32.30	17.40	368	86.60
Wisconsin	744	2.0	23.20	13.20	666	89.50
Wyoming	152	2.8	45.80	1.60	132	86.80

1985 FATALITIES
MATRIX NOTES

Column 1 — Total Number of Fatalities

Column 2 — Total Number of Fatalities Per 100 Million Vehicle Miles Traveled (VMT)

Column 3 — Total Number of Fatalities Per 100,000 Drivers

Column 4 — Total Number of Fatalities Per 1,000 Sq. Miles

Column 5 — Total Number of Fatal Accidents

Column 6 — Percent of Fatalities Per Fatal Accident

Source: "Highway Statistics, 1985," U.S. Department of Transportation, Federal Highway Administration, Washington, D.C.
"Fatal Accident Reporting System 1985," National Highway Transportation Safety Administration, Washington, D. C.

Mileage Matrix

	1	2	3	4	5	6	7
Alabama	87,798	10,702	10,947	32	1,000	64,841	276
Alaska	11,601	4,171	35	-	7,395	-	-
Arizona	76,906	6,152	4,788	-	261	30,563	35,142
Arkansas	77,029	10,456	3,458	42	5,660	56,015	1,398
California	174,081	15,080	26,058	185	3,163	98,967	30,628
Colorado	75,972	8,843	2,037	-	450	57,548	7,094
Connecticut	19,633	3,301	2,157	-	599	13,572	4
Delaware	5,313	1,377	-	3	3,340	593	-
Florida	99,071	11,006	8,961	-	529	78,575	-
Georgia	106,257	17,6[illegible]	11,256	226	161	76,345	578
Hawaii	3,939	938	373	-	137	2,410	81
Idaho	69,169	4,924	3,191	57	169	25,797	35,031
Illinois	134,709	14,998	16,092	10	2,564	100,741	304
Indiana	91,396	11,123	8,825	-	150	71,298	-
Iowa	112,478	9,839	15,633	-	357	86,529	120
Kansas	132,409	10,627	22,408	-	71	99,303	-
Kentucky	69,460	12,850	720	38	12,311	43,093	448
Louisiana	58,241	11,958	1,368	17	4,519	39,746	633
Maine	21,955	5,009	731	-	3,001	13,030	184
Maryland	27,564	4,439	2,100	45	960	19,637	383
Massachusetts	33,804	3,047	7,631	9	565	22,444	108
Michigan	117,581	9,429	21,516	-	18	86,618	-
Minnesota	131,998	12,019	16,670	96	1,378	100,111	1,724
Mississippi	71,694	10,102	9,700	-	266	51,287	339
Missouri	119,155	26,836	1,710	-	5,484	84,416	709
Montana	71,543	6,695	4,999	-	1,179	50,756	7,914
Nebraska	92,119	9,974	10,216	23	429	71,367	110
Nevada	43,830	4,651	535	50	539	24,889	13,166
New Hampshire	14,527	2,786	504	-	1,578	9,517	142
New Jersey	33,883	2,385	6,532	-	789	24,136	41
New Mexico	53,564	8,940	129	-	3,503	34,564	6,428
New York	110,027	14,964	9,981	-	1,413	83,669	-
North Carolina	93,214	18,141	51	22	58,949	13,374	2,677
North Dakota	85,890	7,295	9,733	-	53	68,195	704
Ohio	112,984	18,144	9,255	-	2,322	83,234	29
Oklahoma	110,674	11,787	7,695	-	1,245	89,927	20
Oregon	94,000	7,574	7,900	1	3,251	33,495	41,779
Pennsylvania	115,663	23,511	2,948	-	89,192	12	-
Rhode Island	5,997	1,104	498	-	75	4,320	-
South Carolina	63,213	15,871	186	-	24,621	21,936	599
South Dakota	73,293	7,796	9,990	265	85	53,463	1,694
Tennessee	83,831	13,289	2,223	-	359	67,944	16
Texas	282,254	55,390	4,536	6	16,254	205,096	972
Utah	48,563	5,422	1,438	34	241	25,008	16,420
Vermont	14,031	2,569	1,088	-	222	10,071	81
Virginia	65,492	18,388	1,555	-	36,564	7,258	1,727
Washington	81,074	6,951	9,906	-	11,535	42,641	10,041
West Virginia	35,117	9,799	275	-	21,505	2,138	1,400
Wisconsin	108,507	11,855	12,313	-	643	83,512	184
Wyoming	38,239	6,087	532	62	936	26,970	3652

MILEAGE MATRIX NOTES

Existing Public Road and Street Mileage - 1985

Column 1 -- Total Rural and Urban Mileage (Federal Aid and Non-Federal Aid)

Column 2 -- Federal Aid Highway Systems (Rural and Urban)
Mileage Under State Control

Column 3 -- Federal Aid Highway Systems (Rural and Urban)
Mileage Under Local Control

Column 4 -- Federal Aid Highway Systems (Rural and Urban)
Mileage Under Federal Control

Column 5 -- Mileage Not On Federal Aid Systems
Mileage Under State Control

Column 6 -- Mileage Not On Federal Aid Systems
Mileage Under Local Control

Column 7 -- Mileage Not On Federal Aid Systems
Mileage Under Federal Control

Source: "Highway Statistics 1985," U.S. DOT, FHWA, pg. 115.

65mph Matrix

	1	2	3
Alabama	3,400,930	653	75
Alaska	362,976	1,053	97
Arizona	2,317,727	1,102	95
Arkansas	1,412,585	447	82
California	19,612,115	1,508	63
Colorado	2,869,492	770	83
Connecticut	2,523,824	112	33
Delaware	475,082	0	0
Florida	10,096,849	936	71
Georgia	4,694,101	944	77
Hawaii	667,347	5	14
Idaho	902,932	576	95
Illinois	7,948,878	1,341	75
Indiana	4,157,710	879	79
Iowa	2,960,592	664	85
Kansas	2,243,561	684	84
Kentucky	2,656,571	617	83
Louisiana	3,069,574	537	78
Maine	887,015	279	89
Maryland	3,343,221	166	43
Massachusetts	3,856,878	186	33
Michigan	6,951,025	730	65
Minnesota	3,558,360	700	79
Mississippi	1,772,315	600	87
Missouri	3,641,069	850	74
Montana	678,079	1,142	98
Nebraska	1,299,918	447	93
Nevada	729,267	509	94
New Hampshire	1,035,606	183	88
New Jersey	5,036,366	131	34
New Mexico	1,220,723	994	94
New York	9,287,745	925	62
North Carolina	4,518,151	630	79
North Dakota	685,723	543	95
Ohio	8,379,113	899	58
Oklahoma	2,970,164	781	84
Oregon	2,288,306	621	87
Pennsylvania	7,428,238	1,184	78
Rhode Island	636,259	21	30
South Carolina	2,259,122	673	86
South Dakota	688,337	645	95
Tennessee	3,856,914	815	77
Texas	12,725,214	2,424	77
Utah	1,153,976	740	87
Vermont	419,154	313	98
Virginia	4,336,209	813	79
Washington	3,665,189	513	71
West Virginia	1,213,489	407	85
Wisconsin	3,390,063	474	82
Wyoming	520,359	887	97

65 MPH MATRIX NOTES

Column 1

Total Number of Registered Vehicles

Includes public and private automobiles, buses, trucks, and motorcycles.
Source: "Highway Statistics, 1985," U.S. Department of Transportation, Washington, D.C., Table MV-1.

Column 2

Rural Interstate Mileage Eligible for 65 mph Speed Limit

Source: "Capital to Capital," National Conference of State Legislatures, Washington, D.C., March 30, 1987.

Column 3

Percent of Total Interstate Mileage Eligible for 65 mph Limit

Source: Ibid.

Bridge Matrix

	1	2	3	4	5	6	7	8	9
Alabama	7,621	1,041	1,793	37.2	7,741	2,989	1,508	58.00	50.40
Alaska	566	27	5	5.65	236	45	13	24.60	29.40
Arizona	4,439	70	170	5.4	825	82	58	17.00	15.70
Arkansas	5,857	348	1,673	34.5	7,096	1,127	3,070	59.00	54.80
California	14,792	499	1,672	14.7	7,478	1,170	2,457	48.50	33.60
Colorado	3,495	418	150	16.3	3,767	1,779	287	54.80	51.90
Connecticut	2,613	579	1,090	63.9	1,145	343	363	61.70	30.50
Delaware	469	51	14	13.9	262	43	32	28.60	35.80
Florida	5,977	124	878	16.8	4,071	617	725	33.00	40.50
Georgia	7,975	924	2,074	37.6	6,311	2,786	452	51.30	44.20
Hawaii	669	83	65	22.1	368	37	98	36.70	35.50
Idaho	1,669	157	68	13.5	2,047	464	398	42.10	55.10
Illinois	10,523	1,616	490	20	14,719	3,883	1,825	38.80	58.30
Indiana	7,158	867	1,780	37	10,445	3,469	2,905	61.00	59.30
Iowa	7,188	825	1,226	28.5	18,822	5,395	5,373	57.20	72.40
Kansas	10,700	889	2,525	32	15,019	4,837	5,178	66.70	58.40
Kentucky	4,914	244	2,257	50.9	7,616	1,262	4,016	69.00	60.80
Louisiana	5,669	848	832	29.6	8,350	3,213	1,608	57.70	59.60
Maine	1,249	140	72	17	1,341	286	289	42.90	51.80
Maryland	2,491	402	392	31.9	1,844	244	511	40.90	42.50
Massachusetts	3,663	977	49	28	1,208	631	31	54.80	24.80
Michigan	5,849	672	250	15.8	4,729	1,739	412	45.50	44.70
Minnesota	5,091	505	360	17	7,879	1,375	1,552	37.10	60.70
Mississippi	7,542	1,646	1,629	43.4	9,480	5,095	840	62.60	55.70
Missouri	8,699	1,880	1,558	39.5	14,936	4,787	6,742	77.20	63.20
Montana	2,429	110	1,235	55.4	2,306	452	1,055	65.40	48.70
Nebraska	5,101	614	921	30.1	10,913	5,172	2,774	72.80	68.10
Nevada	790	10	86	12.2	252	31	41	28.60	24.20
New Hampshire	1,230	177	137	25.5	1,329	388	479	65.20	51.90
New Jersey	4,153	839	450	31	1,710	484	292	45.40	29.20
New Mexico	2,850	251	136	13.6	597	134	92	37.90	17.30
New York	8,809	4,562	613	58.7	8,578	5,681	870	76.40	49.30
North Carolina	5,479	347	1,522	34	10,579	2,252	5,003	68.60	65.90
North Dakota	1,687	159	310	27.8	3,667	1,862	504	64.50	68.50
Ohio	12,150	1,951	156	17.3	16,824	2,636	1,420	24.10	58.10
Oklahoma	8,046	1,038	1,817	35.5	14,887	7,406	2,597	67.20	64.90
Oregon	3,737	295	196	13.1	2,838	330	389	25.30	43.20
Pennsylvania	10,910	2,487	770	29.9	11,410	3,193	1,472	40.90	51.10
Rhode Island	563	75	22	17.2	135	34	19	39.30	19.30
South Carolina	4,217	225	571	18.9	4,681	708	328	22.10	52.60
South Dakota	2,758	248	231	17.4	4,294	1,563	1,372	68.40	60.90
Tennessee	7,404	1,227	1,651	38.9	10,948	4,083	1,496	51.00	59.70
Texas	25,821	1,360	3,459	18.7	18,159	5,358	5,273	58.50	41.30
Utah	1,496	54	31	5.7	967	194	81	28.40	39.30
Vermont	1,291	168	262	33.3	1,368	272	454	53.10	51.40
Virginia	6,856	645	762	20.5	5,707	620	2,051	46.80	45.40
Washington	3,949	473	676	29.1	2,838	287	419	24.90	41.80
West Virginia	3,396	1,169	473	48.4	3,252	1,675	645	71.30	48.90
Wisconsin	6,293	1,836	617	39	6,593	2,369	1,119	52.90	51.20
Wyoming	1908	39	105	7.5	924	283	272	60.10	32.60

BRIDGE MATRIX NOTES

BRIDGES - FEDERAL AID SYSTEM (Columns 1-4)

Column 1 - Total Number of Bridges in National Bridge Inventory (NBI)

Column 2 - Total Number of Structurally Deficient Bridges *

Column 3 - Total Number of Functionally Obsolete Bridges*

Column 4 - Percent of Deficient Bridges
(includes both structurally deficient and functionally obsolete bridges)

BRIDGES - NOT ON FEDERAL AID SYSTEM (Columns 5-9)

Column 5 - Total Number Bridges Not On Federal Aid in NBI

Column 6 - Total Number of Structurally Deficient Bridges *

Column 7 - Total Number of Functionally Obsolete Bridges*

Column 8- Percent of Deficient Bridges
(includes both structurally deficient and functionally obsolete bridges)

Column 9 - Percent of Total Number of Bridges (both federal aid and non-federal aid) Not On Federal Aid System

* A structurally deficient bridge, as defined by FHWA, is one that: (1) has been restricted to light vehicles only, (2) is closed, or (3) requires immediate rehabilitation to remain open.
* A functionally obsolete bridge is one on which the deck geometry, load carrying capacity (comparison of the original design load to the current State legal load), clearance, or approach roadway alignment no longer meet the usual criteria for the system of which it is an integral part.

Source: "Eighth Annual Report to Congress, Highway Bridge Replacement and Rehabilitation Program," U.S. Dept. Of Transportation (DOT), Federal Highway Administration (FHWA), Office of Engineering Bridge Division, 1987.

Load Posting Matrix

	1	2	3	4	5	6	7	8	9
Alabama	7,741	2,824	8	864	4,045	52.3	7,621	2,334	30.6
Alaska	236	133	4	75	24	10.2	566	4	0.7
Arizona	825	710	21	91	3	0.4	4,439	-	-
Arkansas	7,096	3,136	31	720	3,209	45.2	5,857	257	4.4
California	7,478	6,757	34	638	49	0.7	14,792	6	0.04
Colorado	3,767	1,921	24	1,568	254	6.7	3,495	8	0.2
Connecticut	1,145	930	20	190	5	0.4	2,613	2	0.08
Delaware	262	206	4	47	5	1.9	469	5	1.1
Florida	4,071	2,373	46	1,391	261	6.4	5,977	65	1.1
Georgia	6,311	3,102	169	2,847	193	3.1	7,975	40	0.5
Hawaii	368	282	-	77	9	2.4	669	1	0.15
Idaho	2,047	1,366	5	667	9	0.4	1,669	-	-
Illinois	14,719	10,338	171	2,788	1,422	9.7	10,523	255	2.4
Indiana	10,445	4,323	123	2,963	3,036	29.1	7,158	366	5.1
Iowa	18,822	9,821	225	8,574	202	1.1	7,188	28	0.4
Kansas	15,019	6,081	252	8,627	59	0.4	10,700	53	0.5
Kentucky	7,616	4,729	61	973	1,853	24.3	4,914	79	1.6
Louisiana	8,350	3,657	56	1,668	2,969	35.6	5,669	98	1.7
Maine	1,341	1,047	10	110	174	13	1,249	6	0.5
Maryland	1,844	1,174	11	242	417	22.6	2,491	111	4.5
Massachusetts	1,208	670	72	437	29	2.4	3,663	31	0.8
Michigan	4,729	2,608	340	1,757	24	0.5	5,849	25	0.4
Minnesota	7,879	6,285	75	1,458	61	0.8	5,091	21	0.4
Mississippi	9,480	3,537	365	5,169	409	4.3	7,542	164	2.2
Missouri	14,936	11,725	140	3,000	71	0.5	8,699	37	0.4
Montana	2,306	1,139	7	671	489	21.2	2,429	47	1.9
Nebraska	10,913	2,699	127	7,904	183	1.7	5,101	13	0.25
Nevada	252	230	4	17	1	0.4	790	-	-
New Hampshire	1,329	587	17	314	411	30.9	1,230	33	2.7
New Jersey	1,710	1,061	43	590	16	0.9	4,153	21	0.5
New Mexico	597	447	14	136	-	-	2,850	-	-
New York	8,578	6,923	65	1,590	-	-	8,809	-	-
North Carolina	10,579	3,942	29	6,584	24	0.2	5,479	10	0.2
North Dakota	3,667	1,576	1	1,726	364	9.9	1,687	80	4.7
Ohio	16,824	10,111	123	5,558	1,032	6.1	12,150	182	1.5
Oklahoma	14,887	10,761	140	3,847	139	0.9	8,046	473	5.9
Oregon	2,838	2,400	8	373	57	2	3,737	22	0.6
Pennsylvania	11,410	7,085	188	3,095	1,042	9.1	10,910	537	4.9
Rhode Island	135	102	5	27	1	0.7	563	2	0.36
South Carolina	4,681	3,916	29	736	-	-	4,217	-	-
South Dakota	4,294	1,820	79	2,356	39	0.9	2,758	5	0.2
Tennessee	10,948	7,991	109	2,131	717	6.5	7,404	59	0.8
Texas	18,159	9,199	92	2,135	6,733	37.1	25,821	295	1.1
Utah	967	617	24	178	148	15.3	1,496	44	2.9
Vermont	1,368	1,200	12	156	-	-	1,291	-	-
Virginia	5,707	3,413	11	2,283	-	-	6,856	3	0.04
Washington	2,838	2,509	29	297	3	0.1	3,949	-	-
West Virginia	3,252	1,772	58	1,403	19	0.6	3,396	4	0.1
Wisconsin	6,593	5,466	27	1,087	13	0.2	6,293	13	0.2
Wyoming	924	391	15	204	314	34	1908	5	0.3

LOAD POSTING MATRIX NOTES

Count of Open and Posted Bridges Off Federal-Aid System - Columns 1-5
(as of December 31, 1986)

Column 1 - Bridges in Inventory

Column 2 - Open-Not Requiring Load Posting

Column 3 - Closed Bridges

Column 4 - Posted Bridges

Column 5 - Open-should be posted but are not posted

Column 6 - Percentage of Total Bridges that should be posted but are not.

Column 7 - Bridges in Inventory On Federal-Aid System

Column 8 - Open-should be posted but are not posted.

Column 9 - Percentage of Total Bridges on Federal-Aid System that should be posted but are not.

Bridges that require load posting fall into two groups. One group includes structurally deficient bridges that have deteriorated to the extent that they cannot carry the load for which they were designed. The other group includes functionally obsolete bridges that are in good condition but the current State legal load exceeds the original design load and, therefore, the bridges require posting. The number of bridges that are closed or posted or that should be posted but are not, are taken from the NBI as submitted by the States.

Source: "Eighth Annual Report to Congress Highway Bridge Replacement and Rehabilitation Program", U.S. DOT, FHWA, Office of Engineering Bridge Division, Washington, D.C., 1987.

Mass Transportation Matrix

	1	2	3	4	5	6
Alabama	N	-	-	-	-	-
Alaska	N	-	-	-	-	-
Arizona	Y*	29,925	-	-	-	-
Arkansas	N	265	-	-	-	Y
California	Y*	64,200	535,246	-	Y	Y
Colorado	N	-	-	-	-	Y
Connecticut	N	71,456	-	-	-	-
Delaware	N	4,337	-	39,000	-	-
Florida	Y*	11,923	-	417,000	-	-
Georgia	Y*	1,225	141,500	-	-	Y
Hawaii	N	-	-	-	-	-
Idaho	N	-	-	-	-	-
Illinois	N	173,400	-	-	-	-
Indiana	N	12,400	2,756	-	Y	-
Iowa	Y*	1,722	-	-	-	-
Kansas	Y*	-	-	-	-	-
Kentucky	N	670	-	-	-	-
Louisiana	N	6,984	-	-	-	-
Maine	Y*	400	-	-	-	-
Maryland	Y*	211,881	-	82,000	-	Y
Massachusetts	N	231,700	-	300,000	-	-
Michigan	N	89,369	-	335,000 a	Y	Y
Minnesota	Y*	29,360	-	-	-	-
Mississippi	N	11	-	-	-	-
Missouri	Y*	986	-	-	-	-
Montana	N	150	-	-	-	-
Nebraska	N	1,000	-	-	-	-
Nevada	N	368	-	-	-	-
New Hampshire	N	24	-	7,000	-	-
New Jersey	N	221,700	-	-	-	-
New Mexico	N	2,600	-	-	-	-
New York	N	826,852	181,500	190,000 b	-	Y
North Carolina	Y*	1,600	-	98,000	Y	-
North Dakota	N	-	-	-	-	-
Ohio	Y*	32,396	-	2,000	Y	Y
Oklahoma	N	315	-	-	-	-
Oregon	N	2,951	3,572	-	-	-
Pennsylvania	N	310,000	-	50,000	Y	-
Rhode Island	N	9,911	-	-	-	d
South Carolina	Y*	1,264	-	7,000	-	Y
South Dakota	N	-	-	-	-	-
Tennessee	Y*	2,150	-	140,000	-	-
Texas	N	9,775	-	-	-	-
Utah	Y*	575	25,000	200,000	-	-
Vermont	N	E	-	-	-	-
Virginia	N	31,795	9,000	658,000	Y	-
Washington	Y*	1,224	65,990	68,000	-	Y
West Virginia	N	1,214	-	-	-	-
Wisconsin	N	42,810	-	-	-	-
Wyoming	N	74	-	-	-	-

MASS TRANSPORTATION MATRIX NOTES

Column 1 — Use of oil overcharge refunds from the U.S. Department of Energy for transportation-related programs. *AZ, rideshare; *CA, purchase abandoned railroad right-to-way for public transportation; *FL, rideshare, vanpool; *GA, rideshare; *IA, no-interest loans; *KS, rideshare; *ME, local bus routes; *MD, elderly & handicapped programs; *MN - rideshare; *MO, vanpool; *NC, guide to encourage public transportation use; *OH, rideshare; *SC, rideshare; *TN, vanpools; *UT, rideshare; *WA, vanpool, rideshare, parking. (This is a selected list of the programs the states are undertaking with oil overcharge funds.)

Column 2 — Annual Direct State Assistance for Public Transportation ($000's)
E = Total aid is dependent on actual federal appropriations. The VT legislature appropriated $157,000 for FY 86.

Column 3 — Annual Indirect State Assistance for Public Transportation ($000's)

Column 4 — State Funding for Rideshare Programs ($)
a = includes rideshare and vanpool
b = $100,000 funded through State Energy Office.

Column 5 — State Research or Demonstration Program (independent of UMTA) FY'86

Column 6 – State Matching Funds for Federal Research aand Demonstration Programs
d = RI has one UMTA Section 6 R&D project at 100% federal funds.

Source: "1986 Survey of State Involvement in Public Transportation," American Association of State Highway and Transportation Officials (AASHTO), Washington, D.C.

HIGHWAY SAFETY
MAIN MATRIX NOTES

Column 1 — Total Highway Fatalities - 1986
(preliminary 1986 figures)

Source: Fatal Accident Reporting System 1986
U.S. Department of Transportation (DOT), National Highway Traffic Safety Administration (NHTSA), Washington, D.C.

Column 2 — Fatalities per 100 million Vehicle Miles Traveled (VMT)
Source: Ibid.

Column 3 — Accidents Involving Hazardous Materials/ Notification Requirements

Accidents Involving Hazardous Materials 1985
Source: U.S. DOT, NHTSA, Office of Motor Carrier Information Management and Analysis, Washington, D.C.
Commodities Covered by Notification Requirement 1985
x = requires advance notification for transport of hazardous wastes
+ = requires notification of additional hazardous materials
P = certain areas in state have notification requirements
Source: "Transportation of Hazardous Materials," Office of Technology Assessment, Washington, D.C., July 1986, pg. 182.

Column 4 — Seat Belt Laws/Penalty/Enforcement
Seat Belt Laws
Y = Yes, has a seat belt law
N = No, does not have a seat belt law
Penalty or Fine for Violation
P = penalty for violation of law
Enforcement
1 = primary, police can stop unbuckled drivers and issue a ticket
2 = secondary, motorists must be stopped for another offense before being cited for
* = Oregon's enforcement is pending Nov. '88 referendum.
Source: "Status Report," Insurance Institute for Highway Safety, Washington, D.C., December 5, 1987, pg. 4.

Column 5 — Speed Limits (mph)
65 mph on rural interstates
Source: Washington Post and National Conference of State Legislators

Column 6 — Motor Vehicle Inspection/Inspection & Maintenance Program
Motor Vehicle Inspections
P = periodic inspection
R = random inspection
B = periodic inspection, school buses only
L = limited inspections
N = no state requirement for inspection
Source: AAMVA (1983) and NHTS (1987)
Inspection and Maintenance Programs
s = statewide
c = cites/counties (selected)
Source: EPA, July 1987

Column 7 — Percent of Deficient Rural Interstate Mileage/Percent of Deficient Urban Interstate Mileage
Source: Status of the Nation's Highways: Conditions and Performance, Report of the Secretary of Transportation to the US Congress, Deficient Interstate Mileage for 1985. Washington, D.C., June 1987, Table III - 8, p. 41.

Column 8 — Percent Deficiency of Total Bridges
Source: Eighth Annual Report to Congress Highway Bridge Replacement And Rehabilitation Program, U.S. DOT, Federal Highway Administration Office of Engineering Bridge Division, 1987.

Column 9 — Drunk Driving Laws
0 = no legislation
1 = one item of legislation
2 = two items of legislation
3 = three items of legislation
4 = four items of legislation

The four pieces of legislation include: open container; anti-consumption; mandatory fine for first offense; and blood alcohol concentration (BAC) testing for more than 80% of drivers killed in accidents.
Source: Digest of State Alcohol-Highway Safety Related Legislation, Fifth Edition. NHTSA, Washington, D.C., Jan.1987.

Column 10 — Coordination of Rural Mass Transit Programs
1. legislative or executive order
   *=pending
2. state interagency committee or task force
3. state level interagency agreement
4. technical assistance state-to-local

Source: "Coordinating Rural Transit", Michael Greene, The Council of State Governments (CSG), Lexington, KY, Appendix A., 1987.

Column 11 — Per Capita Mass Transit Expenditure/ Per Mile Mass Transit Expenditure
Source: "Financing the Future: Changing Roles in Mass Transit," Krause, R., Patel, D., Gathy, B., CSG, 1987.

Highway Safety Text Notes

1. Renee Montagne, National Public Radio, Sept. 1, 1987.

2. John Dillin, "Potholes, ruts crumbling asphalt mark interstate highway," *The Christian Science Monitor*, Sept. 4, 1987.

33. "The Status of the Nation's Highways: Conditions and Performance," Report of the Secretary of Transportation to the U.S. Congress, June 1987, p.41.

4. *Eighth Annual Report to Congress: Highway Bridge Replacement and Rehabilitation Program*, Federal Highway Administration, Office of Engineering Bridge Division, 1987, p.9.

5. *55 Speed Limit*, Insurance Institute for Highway Safety, Feb. 1987.

6. *Ridesharing Statistics, 1987*, Federal Highway Administration, Office of Traffic Operations, Washington, D.C., 1987.

7. *Transportation: Dangers on the Road*, Citizen's Clearinghouse for Hazardous Wastes, Inc., Arlington, VA, 1986, p. 11.

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3. "Status Report," Insurance Institute for Highway Safety, Washington, D.C.

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5. Digest of State Alcohol-Highway Safety Related Legislation, National Highway Traffic Safety Administration, Washington, D. C., Fifth Edition, January 1987.

6. Facts & Figures '87, Motor Vehicle Manufacturing Association of the U.S. (MVMA), Detroit, MI.

7. Transportation of Hazardous Materials, Office of Technology Assessment, Washington, D.C. July 1986.

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"Financing for the Future: Changing Roles in Mass Transit," Robert A. Krause, Dinker Patel, Brian Gathy, The Council of State Governments, Lexington, KY, 1987.

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THE STATE OF THE STATES 1988

ENERGY POLLUTION CONTROL

6

FOCUS PAPER

RENEW AMERICA PROJECT

Prepared by:

Scott Ridley
The Renew America Project
May 1988

The Renew America Project is a non-profit, tax-exempt educational organization dedicated to the efficient use of all natural resources. The Project provides individual citizens, state agencies and private organizations with information to assist grassroots change to ensure a clean, safe and livable environment for future generations. For further information on the Renew America Project or to obtain additional copies of this report contact: Renew America, 1001 Connecticut Avenue, N.W., Suite 719, Washington, D.C. 20036, (202) 466-6880. See page 24 for ordering information.

Introduction

The purpose of the Energy Pollution Control Focus Paper, one of six focus papers designed to supplement the data in the 1988 State of the States report, is to provide more detailed information on the status of programs and policies to control pollution from energy production in the fifty states. It provides a national picture of energy pollution control efforts through maps, matrices, and explanation of key issues, and it allows comparison of the strength of state programs and policies. It is not intended to be a comprehensive assessment of energy policies in each state, but an accurate measure of key legislation and programs that states have put in place to reduce pollution from mining, oil drilling, and electric generating plants. The report also examines policies to reduce fossil energy consumption through least-cost, energy conservation and renewable energy policies.

For information beyond the scope of this report, please see the contact list on page 23.

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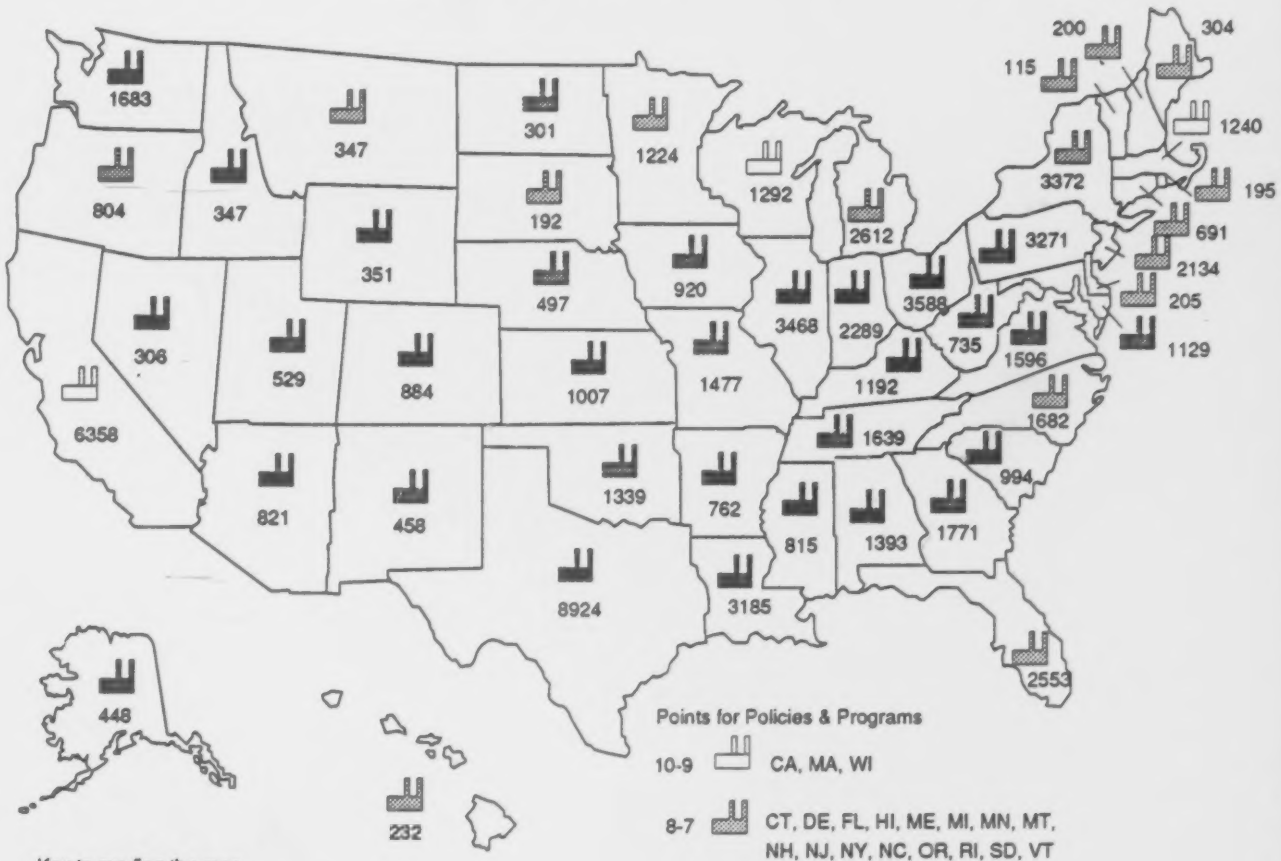
ENERGY POLLUTION & CONSUMPTION



Key to reading the map

Example: Massachusetts - Best Overall

10 points for policies & programs

Energy Consumption

1240 (trillion Btu's)

Energy Consumption Source: DOE/EIA, 1987

Policies & Programs Source: The Fund for Renewable Energy and the Environment, 1988

Points for Policies & Programs

10-9	CA, MA, WI
8-7	CT, DE, FL, HI, ME, MI, MN, MT, NH, NJ, NY, NC, OR, RI, SD, VT
6-5	AK, GA, ID, IL, IA, MD, MO, NE, ND, NM, OK, PA, TN, UT, VA, WA, WV,
4-3	AL, AR, AZ, CO, IN, KS, KY, LA, MS, NV, OH, SC
2-1	TX, WY

Energy Pollution Control

The search for sites to store and dump radioactive waste from nuclear power plants has set off a rumbling controversy in state capitals across the country. Debates in Maine and Texas and Washington brought federal siting efforts to a standstill. And selection of Yucca Mountain in Nevada as the nation's first permanent high level waste dump has set off new controversies. Difficulties are likely to intensify as storage pools at more than 40 nuclear plants reach full authorized capacity in the early 1990s, and as proposals emerge for low-level waste dumps in 10 states.

Nuclear waste is just one of the hidden costs of producing and consuming energy. From hundreds of thousands of acres stripmined for coal—to tens of thousands of unlined pits that hold oil and gas waste—to multi-billion dollar damage from acid rain and climatic change from the "greenhouse effect" of air pollution, the energy we produce and consume delivers a broad array of backend costs.

Damage that would require clean up costs of more than $20 billion per year result from the usual course of operations for four traditional energy sources: coal, oil, natural gas, and nuclear power. Tragic accidents, such as oil spills, gas explosions, or releases of radioactive material, add to the bill.

Unfortunately, the cost of this damage is often not included in energy prices. But the full cost is ultimately paid in tax money used for cleanup or continued degradation of air, land, and water, and threats to public health.

Americans currently consume about 78 quadrillion Btu's of energy each year—roughly one-third of world use. About one-quarter of this energy comes from coal. Two-thirds is from petroleum products and natural gas. The remainder comes from a mixture of wood, hydro, nuclear, and a variety of renewable energy sources. Since 1974, the demand for energy has slackened. Part of the slackening demand is due to conservation and efficiency.1 Today we use 25 percent less energy for every dollar of Gross National Product than we did in 1974. Energy efficiency—using the best available lights, motors, appliances, and other devices—has the potential to reduce our national energy bill from $400 billion a year to $270 billion or less—and provide a cornerstone for reducing the cost of pollution impacts.2

Development of renewable energy from solar, wind, hydro, geothermal, and a number of other sources also has the potential to help minimize the impacts of energy-related pollution. Both federal and state governments will play important roles in how much renewable energy and efficiency is pursued and how this cornerstone to reduce pollution is set.

The most fundamental need is for a change in perception. State policymakers have begun to consider innovative energy supply options in a number of states. But the full environmental costs must be added to examinations of supply and demand. Estimates of "least-environmental-damage" must be included in development of "least-cost" state energy plans.

Coal

Coal has delivered the most visible damage in strip mining and millions of tons of emissions in smoke pouring from the stacks of power plants. Sulphur dioxide and nitrogen oxide produced by burning coal is considered to be a primary cause of acid rain. About 75 percent of sulphur dioxide is estimated to come from coal-burning power plants. Annual damage from acid rain on crops such as soybeans is estimated at $2 billion. Multi-billion dollar damage is also noted for forests, lakes, and buildings.

Most heavily hit are the Northeastern states and Canadian provinces downwind of the heavy coal consumers in the central states. Sensitivity to acid rain damage has also been found recently in Southern, Northwestern and Rocky Mountain states. Ohio (1393 trillion Btu), Pennsylvania (1363 trillion Btu), Indiana (1192 trillion Btu), and Texas (1171 trillion Btu) consume the most energy from coal, and account for one-third of national consumption. They also account for 309 of the nation's 1,283 coal-fired power plants.

National efforts to reduce sulphur dioxide emissions by 8 to 12 million tons per year using scrubbers or low sulphur coal are expected to cost up to $6 billion dollars annually. Debates at the national level about sources of acid rain and who will pay to cap pollution contributing to it have paralyzed federal action. But individual states have begun to take action. Approximately 30 states have put acid rain research programs in place. Six states—Massachusetts, Michigan, Minnesota, New Hampshire, New York, and Wisconsin— have instituted control programs. Unfortunately, the major coal consuming states are not among those states with acid rain control programs.

One study of alternatives for reducing emissions found that states could utilize end-use efficiency—using efficient motors, lights, and appliances—to reduce acid rain emissions at the lowest cost. In examining an eight state area from Michigan to Virginia, the study showed that, by using aggressive end-use

efficiency measures, no new power plants would be needed until 2005, and the plants contributing the pollution most expensive to control could be shut down.3

Strip Mining

There are also serious adjustments needed for stripmining that has left tens of thousands of acres of highwalls exposed, trees and topsoil buried in waste, hillsides eroded, and streams and rivers clogged with sediment and polluted with acid drainage.

In 1977, Congress passed the Surface Mining Control and Reclamation Act (SMCRA) to halt the growth in acreage of coal-mined land left abandoned. The law established a coordinated effort between the states and the federal government with national standards and procedures for issuing permits and a program for reclamation of abandoned lands. One of the most important provisions requires mine operaters to post a bond to cover reclamation costs of the land. The bond is released when reclamation is completed or making satisfactory progress.

Twenty-two states have developed legislation and regulations and gained federal approval to operate SMCRA programs. Nine states with coal reserves have not proposed programs. And eight states with programs also have cooperative authority to oversee mining operations on federal land.

In an atmosphere of deregulation, progress under the act has been mixed at best. Both the General Accounting Office and environmentalists have fired heavy criticism at the program. The National Wildlife Federation says that because of a lack of enforcement and oversight from federal officials, implementation of the act in most states, particularly in Appalachia and the Midwest, is failing.4

The GAO points out that only 13 of the 22 states operating their own programs had established a specific deadline for taking action—such as criminal charges, injunctions, and suspension of a mining permit—against unabated violations. Reclamation bonds have also been criticized for being issued at levels three or four times less than what is needed for final site restoration.5

The federal Office of Surface Mining estimates that between 1978 and 1986, more than 2.6 million acres of land had been surface mined for coal.6 About half—1.4 million acres—had been reclaimed, or was in the process of being reclaimed. A few states, such as Alabama and Ohio, reclaimed more land than was mined within their borders during that period. Approximately 1.1 million acres of coal-mined land was considered abandoned and needing reclamation. The average reclamation costs for the Soil Conservation Service ran more than $7,000 per acre in 1987. At this rate, the total cost of restoring the abandoned land alone would be more than $7 billion.7

Federal energy policy, which sets the context for state actions, currently assumes the U.S. will see increased coal production both for export and domestic use and for increased coal consumption to meet growing electric energy needs. Without federal acid rain legislation, without state caps and emission monitoring programs, and without strengthened enforcement of SMCRA and adequate reclamation bonding, the damage from coal production and consumption is likely to increase—raising the ultimate costs to be paid by the environment and public health.

Oil and Natural Gas

The environmental damage from production of oil and natural gas is not as visible as the damage from coal production, but serious threats exist beyond widely reported accidents, such as tanker spills and explosions, particularly to groundwater in the 33 states that produce oil or gas.

Most of the production of oil and natural gas in the United States comes from six states: Alaska, California, Louisiana, Oklahoma, Texas, and Wyoming. A quiet and pervasive problem is what to do with wastes from drilling and production that often contain toxic chemicals. The traditional method is to store drilling wastes and produced water in "surface impoundments"—pits and pools that often have no lining. The wastes are usually dumped on land, on roads, in surface water, or injected into spent wells or waste wells when the pits and ponds are cleaned out.

State figures supplied to EPA show more than 100,000 oil and natural gas surface impoundments nationwide.8

States generally have only conditional liner requirements for the pits and Kansas is the only state that strictly requires liners for all produced water pits. Field inspection and enforcement also vary. Sixteen producer states have no state field inspectors and rely on federal inspectors from the Bureau of Land Management, who are often shared between states.9

Dumping oil and gas wastes into unlined pits has contaminated groundwater in many areas. Drinking water supplies, irrigation, and livestock have been threatened with contamination from toxic substances, such

as arsenic, lead, cadmium, and benzene. Releases of oily wastes in California have resulted in the deaths of wildlife.

Environmentalists fear that widespread contamination of groundwater can result from oil and gas waste surface impoundments, dumping of wastes, and discharge of produced water. They have urged that oil and gas waste be regulated as toxic substances under federal law, and an exemption for these specific wastes removed. EPA, however, has estimated that as much as 70 percent of the waste would be reclassified and cost consumers $6.4 billion per year. The agency has recommended against placing the wastes under the Resource Conservation and Recovery Act.

In order to address threats of oil and natural gas production, stricter liner regulations should be put in place by each state and oil and gas wastes need to be included under the category of toxic substances. The pressures for production should also be lessened by undertaking efforts to minimize consumption.

Electricity and Nuclear Power

Our most refined energy source, and one that threatens the greatest environmental damage, is electricity. About half of electric production comes from coal. Oil accounts for about four percent and natural gas ten percent. In addition to these sources, hydro, geothermal, nuclear, and renewable energy, such as wind and solar contribute to electric supply. The most controversial source by far is nuclear.

At the end of 1987, there were 107 nuclear plants in commercial operation in 32 states and another 14 plants still under construction. Nuclear contributed 17 percent of the nation's electric supply in 1987. While no new nuclear plants have been ordered since 1978 in the United States, the federal government plans to bring about a nuclear resurgence in the mid-1990s.10 Proponents of the plan argue that nuclear power will help reduce the need to burn coal and ease the threats of acid rain and the "greenhouse effect." But the tradeoff does not consider efficiency or renewable energy sources and poses an unnecessary exchange of air pollution for radioactive waste.

The success of the resurgence plan is dependent to a large degree on public acceptance of the safety of nuclear plant operation, resolution of questions on where to dispose of waste that will remain radioactive for longer than 10,000 years, and how to bring down the costs of building nuclear plants.

Nine compacts have been formed between states for cooperative efforts to site low-level radioactive waste dumps and are meeting with strong public resistance in many areas At least eight states have refused to join compacts. There has also been strong resistance to the siting of disposal sites for high level radioactive waste. Part of the problem is that states are being required to take title and liability for radioactive wastes that will be hazardous for thousands of years, without being given authority to regulate plants that generate the waste.

In the meantime, high-level wastes are being kept in "storage pools" at the plants. Pools at more than 40 plants will fill to their authorized capacity in the early 1990s. Proposals are expected for the expansion of pool size or authorized capacity and also for transport of high-level waste to temporary storage sites.

If all of the shipping is done by truck, it will require 6,405 shipments annually. If it is done by rail, it will require 830 shipments annually. Nearly every state is affected. The most heavily traveled roads for radioactive cargo are Interstate 80, which spans the country, and Interstate 95, the north-south route from Florida to Maine.

The policies of states along transport routes vary widely, with only 18 states requiring advance notification of the shipments. Also, most states along transport routes have only limited public response teams to respond to accidents. A few states, such as Idaho, South Carolina, Ohio and Missouri, that see frequent radioactive shipments have no public response teams and rely on federal authorities or private companies.11

In addition to radioactive waste generated by the operation of nuclear plants, waste is also generated by uranium mining and processing. Several of the uranium mining and processing sites have seriously contaminated land and water and are on the federal Superfund list for toxic cleanup.

The federal government and taxpayers are picking up the tab for Superfund sites and major costs for nuclear waste disposal. Nuclear waste disposal costs alone are expected to be more than $37 billion. By some federal estimates, this figure could easily double.

Energy Efficiency

These topics offer only a brief sketch of the types of energy-related pollution generated in the usual course of operations. Studies need to be conducted to assess the full environmental costs of each source. But even without these studies, it is evident that energy efficiency is the cheapest method

Energy Pollution Control Main Matrix

	1	2	3	4	5	6	7	8	9	10	11
Alabama	1393	21122	107211	ND	196957/321505	R	5/ 2	1991-1994		3	
Alaska	448	681310	306468	385	1000/0	R				3	
Arizona	821	161	A	ND			3	1993, 2003	C	3	ex 12/87
Arkansas	762	15778	132470	25,000	2950/515		2	1998, 2003		2	
California	6358	406665	469444	ND		R	6	1987-2000	C	1	ex 12/86
Colorado	884	29309	158456	4,500	55898/496		1	ND	C	3	ex 12/86
Connecticut	691					R	4	1991-1994		2	ex 12/86
Delaware	205									3	open end
Florida	2553	9383	8914	4			5	1993-1997		1	
Georgia	1771						3/ 1	1991		3	12/ 89
Hawaii	232									3	12/ 92
Idaho	347								H	2	open end
Illinois	3468	27245	A	ND	119981/20626	R	12/ 1	1988-2003	C/L/H	1	
Indiana	2289	4759	A	ND	304285/15050	R				2	ex 12/87
Iowa	920				11298/2016	R	1	1998		1	
Kansas	1007	67304	4483[illegible]4	1,381	10903/6120		1	ND		3	
Kentucky	1192	6475	A	ND	453894/347192	R			L	3	ex 12/86
Louisiana	3185	512108*	48885.2	20,000	29634/59		2	1993, ND		3	
Maine	304					R	1	1987		1	12/ 88
Maryland	1129		A	3	6854/15378	R	2	1991		2	
Massachusetts	1240					R/C	2	1990, 1993		2	12/ 91
Michigan	2612	25688*	127008	ND		R/C	5	1993-2002	C	3	12/ 88
Minnesota	1224					R/C	3	1993-1999		2	
Mississippi	815	29997	142716	299			1	1993		3	
Missouri	1477	110	A	ND	55455/7982	R	1	1993		2	
Montana	347	27072	49491	ND	43684/57					2	12/ 93
Nebraska	497	7098	A	726			2	1996	C		ex 12/85
Nevada	306	2907		2		R			C/L/H	1	
New Hampshire	200					C	0/ 1			2	
New Jersey	2134					R	4	1990-2004		2	
New Mexico	458	75712	7098883	15,761	112091/21217	R				2	12/ 89
New York	3372	853	A	ND		C	6/ 1	1992-1996	L/H	2	
North Carolina	1682					R	5	1992-2010	C	2	open end
North Dakota	301	45628	59605	ND	53128/6205	R				3	open end
Ohio	3588	13442	A	5,180	144293/171246	R	2/ 1	1993, ND		2	
Oklahoma	1339	149105*	1917490	6,735	97034/36133					3	12/ 90
Oregon	804		A	ND			1	1993		1	12/ 90
Pennsylvania	3271	3783	A	19,702	211443/122411	R	8/ 1	1991-1997	C	2	
Rhode Island	195					R				3	6/ 90
South Carolina	994						7	1991-2008	C/L/H	2	open end
South Dakota	192	1586	A	ND		R				3	
Tennessee	1639	644	A	3,400	32292/15618	R	2/ 2	1994			
Texas	8924	839606*	6092105	5,500	139990/46076	R	0/4			1	
Utah	529	39172	88129	ND	3076/49					3	12/ 90
Vermont	115						1	1992		1	
Virginia	1596	18	A	3	36166/53307	R	4	1987-1993		2	ex 12/86
Washington	1683				14591/9	R	2/ 2	1993, ND	L/H	2	
West Virginia	735	3145	130058	ND	136883/174046	R				3	
Wisconsin	1292					R/C	3	1992, 1995		1	
Wyoming	351	121337*	495459	ND	329884/2694					3	

of reducing pollution costs and the rate of energy consumption. Beyond efficiency measures, renewable energy sources will offer increasingly attractive comparisons when full costs are accounted.

States have begun to discuss more energy efficiency and conservation. During the period from June 1986 to July 1987, 37 states undertook actions to explore or promote least-cost electrical planning. But only two states adopted progressive least-cost planning regulations and two states passed least-cost electrical planning statutes. Ten states are currently considered to have comprehensive least-cost provisions.

Also, in the wake of drastic federal reductions in support for renewable energy technologies and phase-out of tax credits, 8 of the 24 states that once offered renewable energy tax credits have let these provisions expire. Most notably, California which was once seen as the leader in progressive energy policy, failed to extend renewable energy tax credits at the end of 1987.

MATRIX KEY

1. Energy Consumption: 1985 trillion Btu, combines coal, petroleum, natural gas and electricity from non-fossil fuel sources.

2. Oil Production: 1986 thousands of barrels, "*" indicates preliminary data.

3. Natural Gas Production: 1986 million cubic feet marketed data, "A" indicates minor producer.

4. Number of Gas and Oil Surface Impoundments: estimated number of oil and natural gas surface impoundments (pits and ponds) in each state, "ND"—state lacking data.

5. Acres Surface Mined/Acres Reclaimed: 1978-1986 DOI Office of Surface Mining cumulative figures.

6. Acid Rain Policies: "R"—research program in place, "C"—control program for acid rain pollutants in place.

7. Number of Nuclear Plants in Commercial Operation/Number Under Construction: January 1988 status.

8. On-Site High-Level Radioactive Waste Storage Pool to Meet Authorized Capacity: dates compiled from 1986 NRC data.

9. High Level and Low Level Rad Waste Facilities: "C"--low level facility planned as part of compact, "L"--low level facility in operation or closed, "H"--high level facility in operation or closed.

10. Least-Cost Policies: "1"—comprehensive regualtory authority and policies in place requiring integrated planning and investment by utilities, "2"—state has made some progress toward least-cost planning and has some control over utility investment, "3"—state has made little progress in implementing policies and developing authority to encourage least-cost electrical strategies.

11. Tax Credits: "ex"--date credits expired, "open end"--provision has no expiration.

For sources, see page 22.

TEXT NOTES

1. State Energy Data Report: Consumption Estimates 1960-1985, U.S. DOE/EIA, 1987.

2. *The Role of Federal Research and Development in Advancing Energy Efficiency: A Multi-Billion Dollar Contribution to the U.S. Economy*, American Council for an Energy Efficient Economy, Washington, D.C., September 1987, p. 3.

3. *Acid Rain and Electricity Conservation*, American Council for an Energy Efficient Economy, Washington, D.C., July 1987.

4. *Surface Mining: State and Federal Use of Alternative Enforcement Techniques*, U.S. General Accounting Office, August 1987.

5. Cathy Carlson, "Surface Mining Reclamation," The Leader, National Wildlife Federation, August 1987, pp. 6-7.

6. *Surface Coal Mining Reclamation: 10 Years of Progress, 1977-1987*, Office of Surface Mining Reclamation and Enforcement, U.S. Department of Interior, August 1987, pp. 42-43. The amount of acreage surface mined does not include land disturbed for roads and preparation plants.

7. Abandoned Mine Program, US Department of Agriculture, staff interview January 1988.

8. *Subtitle D Report*, (Draft), EPA Office of Solid Waste, July 1986.

9. *Report to Congress: Management of Wastes from the Exploration, Development, and Production of Crude Oil, Natural Gas, and Geothermal Energy*, EPA Office of Solid Waste, December 1987.

10. *Strategic Plan for the Civilian Reactor Development Program*, (Draft), U.S. Department of Energy, October 1985; also see Richard Rudolph and Scott Ridley, *Power Struggle: The Hundred Year War Over Electricity*, Harper and Row, 1986.

11. *Transportation of Hazardous Materials*, Office of Technology Assessment, U.S. Congress, July 1986, p. 221

The Final Scores

	Energy Pollution Control Points	Total Points	Overall Ranking
Massachusetts	*10	45	1
Wisconsin	9	45	
California	9	44	3
New Jersey	7	44	
Connecticut	7	43	5
New York	7	42	6
Oregon	8	42	
Florida	8	41	8
North Carolina	8	40	9
Hawaii	7	38	10
Michigan	8	38	
Minnesota	8	38	
New Hampshire	7	38	
Rhode Island	8	37	14
Maine	8	36	
Vermont	7	36	
Maryland	6	35	17
Iowa	6	34	18
Virginia	5	34	
Delaware	7	32	20
Washington	5	32	
Nebraska	5	31	22
Pennsylvania	5	31	
Ohio	4	30	24
Colorado	4	29	25
Illinois	4	29	
Montana	7	29	
Utah	5	29	
Indiana	4	28	29
Georgia	6	27	30
South Dakota	7	27	
North Dakota	6	26	32
West Virginia	3	26	
Arizona	3	25	34
Idaho	6	25	
Kansas	4	25	
South Carolina	3	24	37
Kentucky	4	23	38
Missouri	5	23	
New Mexico	5	22	40
Alabama	4	21	41
Alaska	5	21	
Louisiana	3	20	43
Tennessee	5	20	
Nevada	4	19	45
Oklahoma	5	19	
Texas	2	19	
Arkansas	4	17	48
Mississippi	4	17	
Wyoming	1	15	50

Key:

Energy Pollution Control Points are based on a scale of 1 to 10. The points were derived from the data in the matrices and measure the strength of state programs and policies to protect the environment. See "Ranking Notes" on page 9 for detailed explanation.

Total Points consist of a maximum score of 60 points. Each of the six topics in the 1988 main report have a maximum value of 10 points. (The six topics are: Indoor Pollution, Surface Water Protection, Reducing Pesticide Contamination, Land Use Planning, Highway Safety, and Energy Pollution Control.) The point values for each topic are added together to give the state's total point score.

Overall Ranking is the ranking of the states based on the total points received for all six topics. In the case of a tie each state is given the same ranking. Example: Both Massachusetts and Wisconsin received 45 points and tied for first place.

Summary Example: With 32 points, Washington ranks 20th in the nation for the strength of state environmental programs examined. For energy pollution control, Washington received only 5 points on a 10 point scale. The 5 points received for energy pollution control were added together with the points received for the remaining five topics to equal the total point score of 32.

* **Massachusetts** was judged to have the strongest programs and policies for energy pollution control and received a maximum of 10 points (see Energy Pollution Control Snapshot).

Energy and Pollution Snapshot

Energy-related pollution is generated by both consumption and production of energy supplies. Production profiles of states vary widely, depending on geographic location and resource base. But each state needs regulation of the damage resulting from energy production, regardless of source. In assessing the states, only the energy supplies used or produced were considered. A generic issue was the need for policies to control pollution from energy consumption and measures to encourage maximum efficiency in energy use.

Massachusetts represents the best policies to control energy-related pollution. The state has moved steadily in the direction of energy efficiency by passing laws and regulations for conservation and least-cost electrical planning, appliance efficiency standards, and building code provisions. The state also reauthorized its renewable energy tax credits and is examining options for co-generation to produce both heat and electricity in state buildings.

Although it has no oil or natural gas wells and no coal mining, the state does contain two operating nuclear plants as well as coal-fired power plants. It has not joined a compact for disposal of low-level radioactive waste, requires advance notification for transport of high-level radioactive waste, and has challenged the federal government's efforts to usurp state authority over emergency evacuation planning. The state has also developed acid rain research and acid rain control programs.

Currently:

- 33 states contain a total of more than 100,000 oil and gas waste surface impoundments (pits and ponds);
- 16 states have no available data on the number of oil and natural gas waste surface impoundments within their borders;
- 16 states reclaimed less than half the land stripmined for coal during the period between 1978 and 1986;
- 32 states have a total of 107 nuclear plants in operation, and 17 require notification for transport of high-level radioactive waste;
- 10 states have adopted comprehensive least-cost electrical planning policies;
- 16 states offer renewable energy tax credits.

Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring, enforcement, and indications of progress. Although programs mandated by state legislatures rather than innovative projects, are given greater weight, attention is given to assure that states have not simply "papered-over" a problem with new legislation.

The evaluation is both comparative and subjective and is not intended to represent an absolute scale in which the top state is doing everything possible to protect the environment on a given topic. Research material and data the rankings are based on are drawn from a variety of sources: individual telephone and mail surveys of the states; information filed by the states with federal agencies; studies and surveys conducted by academic institutions, private contractors, and national environmental organizations; and information from peer reviewers. In each case, we have utilized what we believe to be the best data available.

The ranking for this topic considered the impacts and policies of energy sources produced and consumed by each state. In addition to total energy consumption noted on the matrix, consumption of petroleum, natural gas, coal and electricity were examined individually and gauged against the development least-cost electric policies and support for renewable energy development. The primary emphasis, however, was on production-related pollution.

Consideration of the controls on production-related energy pollution was limited to: examinations of stripmining for coal, chiefly the acres of land disturbed and the acres reclaimed (indicated by release of reclamation bonds); research and control programs for acid rain pollutants; the number of surface impoundments and policies regarding liners for pits and ponds, as well as discharge of produced water and injection of wastes; and the number of nuclear plants in operation and under construction, the siting of radioactive waste dumps within the state, whether the state is a secondary or primary route for radioactive waste transport, and requirements for advance notification of radioactive waste transport and the existence of and number of public hazard response teams.

Energy sources not applicable to a state, or produced in a lesser quantity were factored out of the assessment, and only those sources applicable were considered in the ranking.

State Energy Consumption Matrix

	1	2	3	4	5	6
Alabama	663.20	228.00	453.10	154.70	71.20	1,393
Alaska	5.20	214.90	220.50	0.00	7.70	448
Arizona	344.50	136.40	317.50	12.20	144.60	821
Arkansas	219.70	199.20	302.70	106.90	45.80	762
California	43.00	1,895.90	3,098.30	213.30	369.80	6,358
Colorado	299.70	223.10	332.60	-0.30	24.40	884
Connecticut	21.30	80.60	436.70	137.50	3.20	691
Delaware	71.60	38.90	120.20	0.00	0.00	205
Florida	467.10	303.00	1,298.30	253.60	2.50	2,553
Georgia	726.60	289.70	754.00	109.50	29.20	1,771
Hawaii	0.00	2.70	227.90	0.00	0.90	232
Idaho	9.40	41.00	105.90	0.00	112.90	347
Illinois	801.40	989.00	1,137.70	422.70	1.40	3,468
Indiana	1,192.00	435.60	747.70	0.00	4.40	2,289
Iowa	268.30	226.60	340.60	20.80	21.20	920
Kansas	260.30	354.80	396.30	41.70	0.10	1,007
Kentucky	712.70	182.50	464.80	0.00	30.40	1,192
Louisiana	159.00	1,446.00	1,352.10	26.60	0.00	3,185
Maine	1.90	2.60	192.50	57.90	34.90	304
Maryland	264.40	156.00	467.10	107.30	15.80	1,129
Massachusetts	110.60	224.40	761.70	66.30	47.30	1,240
Michigan	785.00	744.70	854.10	145.40	14.40	2,612
Minnesota	227.90	259.00	495.20	125.10	37.70	1,224
Mississippi	109.40	233.20	337.40	46.80	0.00	815
Missouri	521.00	259.10	578.80	86.80	30.90	1,477
Montana	99.30	47.20	160.20	0.00	105.90	347
Nebraska	114.60	124.50	194.80	44.70	14.90	497
Nevada	126.30	41.70	136.10	0.00	45.20	306
New Hampshire	38.80	10.90	122.50	0.00	20.90	200
New Jersey	101.50	391.70	1,215.40	192.10	-2.50	2,134
New Mexico	268.30	158.70	216.80	0.00	1.30	458
New York	304.70	795.40	1,603.60	260.40	459.80	3,372
North Carolina	555.00	138.80	665.10	208.60	42.30	1,682
North Dakota	307.20	29.10	118.70	0.00	49.80	301
Ohio	1,393.70	763.90	1,129.50	21.00	1.80	3,588
Oklahoma	236.90	612.10	466.10	0.00	41.10	1,339
Oregon	10.30	85.80	316.00	74.70	474.30	804
Pennsylvania	1,363.60	657.60	1,196.70	283.50	10.00	3,271
Rhode Island	0.20	30.70	108.80	0.00	4.30	195
South Carolina	258.10	100.60	346.20	344.00	19.00	994
South Dakota	34.20	25.40	98.30	0.00	55.10	192
Tennessee	588.10	197.10	562.10	104.50	67.60	1,639
Texas	1,171.30	3,521.10	4,099.30	0.00	14.40	8,924
Utah	204.40	124.20	185.00	0.00	10.50	529
Vermont	2.10	5.00	63.80	32.40	12.80	115
Virginia	303.50	145.20	670.60	241.10	8.70	1,596
Washington	93.80	139.60	596.00	86.90	806.00	1,683
West Virginia	882.40	128.90	246.80	0.00	10.90	735
Wisconsin	365.20	310.50	454.90	118.70	26.30	1,292
Wyoming	407.90	87.00	128.20	0.00	11.00	351
TOTALS	17,520.20	17,868.90	30,924.70	4,147.30	3,362.70	74,023

STATE ENERGY CONSUMPTION MATRIX NOTES

Column 1--Trillion Btu of Coal Consumed 1985

Column 2--Trillion Btu of Natural Gas Consumed 1985

Column 3--Trillion Btu of Petroleum Consumed 1985 (including transportation)

Column 4-- Trillion Btu Electricity Consumed (Nuclear) 1985 (hydro, nuclear, geothermal and other non-fossil fuel sources)

Column 5 - Trillion Btu Electricity Consumed (Hydro) 1985

Column 6--Trillion Btu Combined Total Energy Consumed 1985

(Source: State Energy Data Report, DOE/EIA, April 1987 p. 1)

Oil and Natural Gas Matrix

	1	2	3	4	5	6	7	8	9	10	11
Alabama	28	21,122	107,211	ND	–/–			–/			
Alaska	1,867	681,310	306,468	385	C/C	1y/L,R,SW,I	C	16s/1f	104	1191	944
Arizona	S	161	A	ND	–/–			–/			
Arkansas	43	15,778	132,470	25,000	NR/NL	60d/L,I	P	9s/–	2492	9490	2422
California	1,114	406665*	469,444	ND	C/C	–/L,SW	C	31s/7f	1566	55079	22132
Colorado	80	29309*	158,456	4,500	C/C	6m/L,SW	C	–/10f			
Connecticut											
Delaware											
Florida	26	9,383	8,914	4	–/–			–/			
Georgia											
Hawaii											
Idaho											
Illinois	75	27,245	A	ND	–/–						
Indiana	13	4,759	A	ND	–/–						
Iowa											
Kansas	184	67,034	448,334	1,381	NR,C/R	1y/R	P	30s/*	12680	57633	29804
Kentucky	18	6,475	A	ND	–/–			–/			
Louisiana	1,403	512108*	4,888,512	20,000	NR/NL	6m/L,SW,I	C/NC	36s/*	14436	25823	8872
Maine											
Maryland	–	–	A	3	–/–			–/			
Massachusetts											
Michigan	70	25688*	127,008	ND	–/–	–/L,I	P	–/			
Minnesota											
Mississippi	82	29,997	142,716	299	–/–			–/			
Missouri	S	110	A	ND	–/–			–/			
Montana	74	27,072	49,491	ND	–/–			–/			
Nebraska	19	7,098	A	726	–/–			–/			
Nevada	8	2,907	–	2	–/–			–/1f			
New Hampshire											
New Jersey											
New Mexico	207	75,712	709,883	15,761	NR/C	–/L	C	10s/*	18308	21968	7742
New York	2	853	A	ND	–/–						
North Carolina											
North Dakota	125	45,628	59,605	ND	–/–			–/			
Ohio	37	13,442	A	5,180	NR,C/NR	5m/L,SW,I	C	66s/*	31343	29210	7912
Oklahoma	409	149105*	1,917,490	6,735	NR,C/NR	1y/L,I	P	52s/*	23647	99030	45606
Oregon	–	–	A	ND							
Pennsylvania	10	3,783	A	19,702	–/–			34s/*	24050	20739	12366
Rhode Island											
South Carolina											
South Dakota	4	1,586	A	ND	–/–			–/			
Tennessee	2	644	A	3,400	–/–						
Texas	2,300	839606*	6,092,105	5,500	NR/C	1y/L,SW,I	C	120s/*	68811	210000	106282
Utah	107	39,172	88,129	ND	–/–			–/10f			
Vermont											
Virginia	S	18	A	3	–/–			–/			
Washington											
West Virginia	9	3,145	130,058	ND	NR,C/NR,C	6m/L	C	15s/*	32500	15895	1522
Wisconsin											
Wyoming	332	121337*	495,459	ND	NR,C/NR,C	1y/L,R,SW,I	C	11.5s/*	2220	12219	11760

OIL AND NATURAL GAS MATRIX NOTES

Column 1--thousand barrels of crude oil produced per day in 1986
("S" symbol signifies 500 barrels per day or less; -- means information not provided)
(Source: Petroleum Supply Annual 1986, DOE/EIA, p. 31)

Column 2--thousand barrels of crude oil produced in total for 1986
("*" symbol signifies initial estimate from DOE)
(Source: Petroleum Supply Annual 1986, DOE/EIA, p. 31)

Column 3--million cubic feet of marketed natural gas produced in 1986
("A" symbol signifies small producer--total for all such small producing states in 1986 was 477,000 million cubic feet)
(Source: Natural Gas Monthly, DOE/EIA, July 1987, p.44)

Column 4--number of oil and natural gas surface impoundments (pits, ponds, and lagoons) ("ND" symbol signfies no data)
(Source: Subtitle D Report (Draft) US EPA, 1986)

Column 5--requirements for liners on surface impoundments: Reserve Pit/ Produced Water Pit
("C" signifies conditional requirments for liner depending on topography and local conditions; "NR" means no regulations are legally enforceable for liner; "SL" means synthetic liner required; "NL" means natural liner (such as clay) required)
(Source: Report to Congress: Management of Wastes from the Exploration, Development, and Production of Crude Oil, Natural Gas and Geothermal Energy, US EPA, December 1987, Table VII-1, VII-3).

Column 6--Period for Closure of Reserve Pit Following Shutdown of Drilling at Site/ Waste Removal Requirements
("1y" signifies one year; "60 d" means 60 days; "6m" means six months; "L" means land disposal of residues allowed; "SW" means surface water disposal of residues allowed; "R" means disposal of residues on roads allowed, "I" means injection of wastes in wells allowed)
(Source: Ibid. Table VII-2)

Column 7--Produced Water Discharge Requirements
("C" means conditional requirments for produced water discharge; "P" means discharge of wastewater/produced water prohibited; "C/NC" (Louisiana allows discharge with permit and investigates only upon complaint)
(Source: Ibid. Table VII-4)

Column 8--Number of Enforcement Positions in State Program/Federal Bureau of Land Management
("s" signifies state positions--some states include all regulatory field staff and others only oil and gas reulatory staff; "f" signifies federal positions; "*" signfies federal staff shared with other state or states)
(Source: Ibid. Table VII-7, VII-8)

Column 9--Number of Natural Gas Wells
(Source: Ibid. Table VII-6, VII-7)

Column 10-- Number of Oil Wells
(Source: Ibid. Table VII-6, VII-7)

Column 11--Number of Injection Wells
(number of total Class II injection wells, EOR wells, and disposal wells)
(Source: Ibid. Table VII-6S).

Coal Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Alabama	196,957	321,505	S,C	X	663.20	41	11,281	9	535.37	5,269.00	2	1,411		R
Alaska	1,000	0	S	X	5.20	5	53	0						R
Arizona					344.50	12	5,121	1		505.00	3	1,095		
Arkansas	2,950	515	S	X	219.70	5	3,758	0	26.74					
California				X	43.00			0						R
Colorado	55,898	496	S,C	X	299.70	31	4,979	8		1,209.50	3	843		
Connecticut					21.30	1	399	0	29.12					R
Delaware					71.60	5	959	0	50.74					
Florida				X	467.10	26	8,934	7	691.77	2,400.90	3	1,783		
Georgia			F	X	726.60	37	12,767	8	703.55	2,857.40	2	1,636		
Hawaii					0.00			0						
Idaho			F	X	9.40			0						
Illinois	119,981	20,626	S	X	801.40	63	17,258	23	1,109.71	9,181.20				R
Indiana	304,285	15,050	S	X	1192.00	82	20,113	20	1,671.80	6,313.50	2	1,565		R
Iowa	11,298	2,016	S	X	268.30	60	6,432	24	236.00	1,558.20				R
Kansas	10,903	6,120	S	X	260.30	20	5,597	8		1,415.50				
Kentucky	453,894	347,192	S	X	712.70	59	15,550	14	1,028.70	3,529.60	3	1,902		R
Louisiana	29,634	59	S	X	159.00	6	3,572	0	21.29					
Maine				X	1.90			0	17.23					R
Maryland	6,854	15,378	S	X	264.40	13	4,121	7	222.30	2,596.30	1	685		R
Massachusetts			F		110.60	9	1,764	4	257.94	976.00			C	R
Michigan			F	X	785.00	83	13,016	27	607.95	5,332.70	1	32	C	R
Minnesota				X	227.90	63	5,121	25	159.90	1,727.30	2	937	C	R
Mississippi				X	109.40	9	2,198	1	122.05	32.70				
Missouri	55,455	7,982	S	X	521.00	49	11,685	13	1,227.40	3,107.50	2	646		R
Montana	43,684	57	S,C	X	99.30	6	2,514	1		50.00				
Nebraska					114.60	15	3,121	0						
Nevada					126.30	8	2,777	0			2	1,500		R
New Hampshire				X	38.80	5	609	2	79.71	163.60			C	
New Jersey					101.50	9	1,757	3	103.30	1,072.80				R
New Mexico	112,091	24,217	S,C	X	268.30	13	4,235	0						R
New York				X	304.70	28	3,277	13	479.10	2,773.00			C	
North Carolina			F	X	555.00	47	12,556	15	445.42	4,867.50	1	736		R
North Dakota	53,128	6,205	S,C	X	307.20	15	4,057	4		518.70				R
Ohio	144,293	171,246	S,C	X	1393.70	132	24,139	31	2,184.97	9,534.10	1	1,300		R
Oklahoma	97,034	36,133	F	X	236.90	9	4,690	0			1	52		
Oregon			F	X	10.30	1	560	0						
Pennsylvania	211,443	122,411	S	X	1363.60	65	19,175	15	1,422.11	4,827.60				R
Rhode Island			F		0.20			0	5.08					R
South Carolina					258.10	24	5,324	6	210.02	1,758.00	2	1,086		
South Dakota			F	X	34.20	6	515	2		48.00				R
Tennessee	32,292	15,618	F	X	588.10	37	10,020	8	910.13	7,422.00				R
Texas	139,990	46,076	S	X	1171.30	30	17,766	0			21	11,921		R
Utah	3,076	49	S,C	X	204.40	16	2,677	4		460.00	4	2,322		
Vermont					2.10	1	10	1	0.38	30.00				
Virginia	36,166	53,307	S,C	X	303.50	21	4,211	10	157.49	3,885.00	4	5,700		R
Washington	14,591	9	F	X	93.80	2	1,330	0						R
West Virginia	136,883	174,046	S,C	X	882.40	33	14,958	9	983.63	4,457.30	1	300		R
Wisconsin				X	365.20	62	7,879	20		3,594.70	2	24	C	R
Wyoming	329,884	2,694	S,C	X	407.90	19	5,590	4	488.06	661.00				

COAL: SURFACE MINING AND LAND RECLAMATION, CONSUMPTION AND ACID RAIN POLICIES--MATRIX NOTES

Column 1--Number of Acres Stripmined 1978-1986
(Source: Surface Coal Mining Reclamation: 10 Years of Progress, 1977-1987, Office of Surface Mining Reclamation and Enforcement, US Department of Interior, August 1987, pp. 42-43

Column 2--Number of Acres Reclaimed 1978-1986
(Source: Ibid.)

Column 3--Regulation--Inspection and Enforcement Authority
("s" signifies state; "f" means federal; "c" means combined authority though a cooperative state-federal agreement)
(Source: Ibid. p. 3)

Column 4--State Statute Requiring Land Reclamation By Surface Coal Mine Operators
(Source: Audubon Activist, November 1986, p. 16.

Column 5--Coal Consumption--trillion Btu 1985
(Source: State Energy Data Report, US DOE/EIA, April 1987, p.1

Column 6--Number of Coal-Fired Electric Generating Plants
(Source: Inventory of Power Plants in the United States, DOE/EIA, August 1987)

Column 7--Total Megawatts of Coal-Fired Electric Generating Capacity (nameplate number)
(Source: Ibid.)

Column 8--Number of Plants Affected by EPA Proposed Acid Rain Reduction Program (provided as an example of state-by-state impact)
(Source: Inside EPA's Environmental Policy Alert, June 3, 1987)

Column 9--Total Number of Tons of Emissions of Sulphur Dioxide 1980
(Source: Ibid.)

Column 10--Megawatts of Coal Fired Generating Capacity Affected by EPA Proposal (provided as an example of state-by-state impact)
(Source: Ibid.)

Column 11--Number of Additional Coal Plants in Construction Pipeline
(Source: Inventory of Power Plants in the United States 1986, US DOE/EIA)

Column 12--Number of Megawatts of Additional Coal Plants
(Source: Ibid)

Column 13--Acid Rain Control Policies
("C" signifies state has sulphur dioxide and nitrogen oxide emission control plan in place)
(Source: 1987 State of the States survey, Fund for Renewable Energy and the Environment)

Column 14--Research Program on Acid Rain
("R" means state conducts research on acid rain)
(Source: Ibid.)

Commercial Nuclear Reactors

	1	2	3	4	5	6	7
Alabama	5 op./2 const1	2860	1991-1994	2816	3875		
Alaska							
Arizona	2/ 1	2806	1993, 2003	67	1		
Arkansas	2	1845	1998, 2003	718	1864		
California	6	5968	1987-2000	2649	4028		
Colorado	1	336	ND	112	423		
Connecticut	4	3425	1991-1994	1377	99979		
Delaware							
Florida	5	4110	1993-1997	1664	7703		
Georgia	2/ 2	1700	1991, 1991	2137	38311		
Hawaii							
Idaho							X (limited)
Illinois	10/ 3	9075	1988-2003	5832	125727	X (closed)	X (limited)
Indiana							
Iowa	1	597	1998	794	524		
Kansas	1	1238	ND	0	0		
Kentucky						X (closed)	
Louisiana	2	2236	1993, ND	300	34		
Maine	1	864	1987	359	111		
Maryland	2	1829	1991, 1991	374	15119		
Massachusetts	2	863	1990, 1993	1621	75045		
Michigan	5	4272	1993-2002	1469	2336		
Minnesota	3	1755	1993-1999	773	5278		
Mississippi	1	1308	1993	602	260		
Missouri	1	1236	1993	139	6		
Montana							
Nebraska	2	1338	1996	1048	30006		
Nevada						X	
New Hampshire	0/ 1						
New Jersey	4	4060	1990-2004	960	2580		
New Mexico							
New York	5/ 2	4068	1992-1996	2554	8838	X (closed)	X (closed)
North Carolina	4/ 1	4174	1992-2010	2010	2686		
North Dakota							
Ohio	2/ 1	2215	1993, ND	199	424		
Oklahoma							
Oregon	1	1216	1993	311	3515		
Pennsylvania	7/ 2	7501	1991-1997	5339	115912		
Rhode Island							
South Carolina	7	6799	1991-2008	2134	13787	X	X (limited)
South Dakota							
Tennessee	2/ 2	2441	1994, 1994	802	2587		
Texas	0/ 4						
Utah							
Vermont	1	563	1992	551	17284		
Virginia	4	3655	1987-1993	2710	1532		
Washington	2/ 2	2060	1993, ND	394	294	X	X (limited)
West Virginia							
Wisconsin	4	1633	1992-1995	426	2426		
Wyoming							

COMMERCIAL NUCLEAR REACTORS MATRIX NOTES

Column 1--Nuclear Plants in Operation/Under Construction
(any plants not officially cancelled are not considered to be cancelled, even if construction is suspended)
(Source: Inventory of Power in the United States 1986 and updates from Nuclear Information and Resource Service)

Column 2--Megawatts of Capacity (nameplate capacity)
(Source: Ibid.)

Column 3--Date Plants' Rad Waste Storage Pools Will Reach Authorized Capacity Limit
(Source: Status of Spent Fuel Storage Capability, US Nuclear Regulatory Commission, Vol 10 #12, December 1986, pp 3-2, 3-3)

Column 4--Cubic Meters of Low Level Rad Waste Generated by Commercial Reactors
(Source: The 1985 State-by-State Assessment of Low-Level Radioactive Waste Shipped to Commercial Disposal Sites US DOE/LLW-59T, December 1986)

Column 5--Low Level Rad Waste/Curies of Radioactive Activity
(Ibid.)

Column 6--Low Level Rad Waste Disposal or Storage Sites
(Source: Ibid.)

Column 7--High Level Rad Waste Disposal/Storage Sites
(Source: Ibid.)

State Policies on Transport of Nuclear Waste

	1	2	3	4
Alabama	SOUTH EAST		S	3t
Alaska	NORTHWEST/*			
Arizona	WEST. (PRO)		S	5t
Arkansas	CENT		S	2t, 1c
California		high level	S, P	13t, 4c
Colorado	ROCKY MT/*		S, P	4t, 2c
Connecticut	NORTHEAST	high level +	S	3t
Delaware	APPLACH			
Florida	SOUTHEAST	high level +	S	6t, 2c
Georgia	SOUTHEAST	high level +	S	2t, 2c
Hawaii	NORTHWEST			
Idaho	NORTHWEST		S, P	
Illinois	CENT MIDW/*		P	2t
Indiana	MIDWEST		S, P	4t, 1c
Iowa	MIDWEST		P	1t, 1c
Kansas	CENT		P	1t
Kentucky	CENT MIDW		S	2t, 2c
Louisiana	CENT		S	
Maine		+ only	S	
Maryland	APPLACH		S	2t, 1c
Massachusetts		high level onl	S	1t, 1c
Michigan	MIDWEST	high level +	S	4t, 2c
Minnesota	MIDWEST		S	2t, 1c
Mississippi	SOUTHEAST	high level +	S	3t
Missouri			P	2t, 1c
Montana	NORTHWEST		S	
Nebraska	CENT		P	2t
Nevada	ROCKY MT./*	high level +	S, P	3t
New Hampshire			S	2t
New Jersey	NORTHEAST	high level +	S	5t, 1c
New Mexico	ROCKY MT	high level +	S	1t
New York			S	6t
North Carolina	SOUTHEAST/*	high level onl	S, P	1t, 1c
North Dakota			S	
Ohio	MIDWEST	high level +	P	
Oklahoma	CENT		S	4t, 1c
Oregon	NORTHWEST		S, P	4t, 1c
Pennsylvania	APPLACH./*		S, P	6t, 1c
Rhode Island		high level +	S	1t
South Carolina	SOUTHEAST/*	high level +	S, P	
South Dakota	WEST		S	
Tennessee	SOUTHEAST	high level onl	S	1t
Texas			S	7t, 1c
Utah	NORTHWEST		S, P	1t
Vermont		high level +	S	1t
Virginia	SOUTHEAST	high level +	S, P	7t, 1c
Washington	NORTHWEST/*		S, P	4t
West Virginia	APPLACH		P	1t
Wisconsin	MIDWEST		S, P	2t
Wyoming	ROCKY MT		P	2t

STATE POLICIES ON TRANSPORT OF NUCLEAR WASTE
MATRIX NOTES

Column 1--Member of Regional Radioactive Waste Compact
("*" symbol signifies state hosting low-level radioactive waste storage site; the compacts are Southeast, Northwest, West, Central, Rocky Mountain, Appalachian, Central Midwest, Midwest)
(Source: The 1985 State-by-State Assessment of Low-Level Radioactive Wastes Shipped to Commercial Disposal Sites, US DOE, December 1986 and updates from Nuclear Information and Resource Service)

Column 2--Notification Required for Shipment of Spent Fuel and High Level Radioactive Waste
("+" symbol indicates other radioactive waste also included in notifications requirement)
(Source: Transportation of Hazardous Materials, US Office of Technology Assessment, July 1986, p. 182)

Column 3--Highways In State Commonly Used for Radioactive Materials Shipments
("P" signifies primary route; "S" indicates secondary route--some states contain both)
(Source: Ibid., p. 111)

Column 4--Number of Public Hazardous Materials Response Teams
("t" indicates a city or town based team; "c" indicates a county based team--some states have both types of trained teams)
(Source: Ibid. p. 16)

Least-Cost, Conservation and Renewable Energy Matrix

	1	2	3	4	5	6
Alabama	3					
Alaska	3					
Arizona	3	R,S		exp. 12/87		
Arkansas	2					
California	1	R	X	exp. 12/86	X	X
Colorado	3	R		exp. 12/86		
Connecticut	2	R,L,S	X	exp. 12/86		
Delaware	3			open-ended		
Florida	1		X		X	
Georgia	3	L,S		12/ 89		
Hawaii	3	L		12/ 92		
Idaho	2		X	open-ended		
Illinois	1	R				
Indiana	2			exp. 12/87		
Iowa	1		X			
Kansas	3		X			
Kentucky	3	R		exp. 12/86		
Louisiana	3					
Maine	1		X	12/88		X
Maryland	2	R				
Massachusetts	2	R,L		12/ 91	X	X
Michigan	3	S	X	12/ 88		
Minnesota	2	L	X		X	
Mississippi	3					
Missouri	2	R,L				
Montana	2			12/ 93		
Nebraska				exp. 12/85		
Nevada	1	R	X			
New Hampshire	2					
New Jersey	2		X			
New Mexico	2	R		12/ 89		
New York	2	R	X		X	
North Carolina	2	R,L		open-ended	X	
North Dakota	3	R	X	open-ended		
Ohio	2	R				
Oklahoma	3			12/ 90		
Oregon	1	L,S		12/ 90		
Pennsylvania	2	R,L				
Rhode Island	3	S		6/ 90		
South Carolina	2	R,L		open-ended		
South Dakota	3				X	
Tennessee						
Texas	1					
Utah	3			12/ 90		
Vermont	1					
Virginia	2			exp. 12/ 86		
Washington	2	L				
West Virginia	3					
Wisconsin	1	R	X		X	
Wyoming	3					

LEAST-COST, CONSERVATION, AND RENEWABLE ENERGY MATRIX NOTES

Column 1--Least-Cost Electric Energy Policies
("1" indicates comprehensive regulatory authority and policies in place which require integrated planning and investment process for utilities;
"2" indicates state has made some progress toward least-cost planning process and has some control over utility investment;
"3" indicates state has made little progress in implementing policies and authority to encourage least-cost strategies)
(Source: Least-Cost Policies: Is There Really A State Movement, Public Citizen Critical Mass Energy Project, and updates; also see A Brighter Future, State Actions in Least-Cost Electrical Planning, Energy Conservation Coalition, Wash. DC, Dec. 1987)

Column 2--Legislative, Regulatory Actions, Studies on Least-Cost Electrical Planning in 1986 and 1987
("R" indicates attempt to institute new regulation; "L" indicates attempt to pass legislation, "S" indicates study undertaken)
(Source: Ibid.)

Column 3--Conservation Activity 1986 and 1987
("X" indicates attempt to pass energy conservation regulations or legislation)
(Source: Energy Conservation Coalition)

Column 4--Renewable Energy Tax Credits
("ex" indicates date tax credit offering expired; "open-ended" indicates no sunset date for provision)
(Source: State of the States 1987 and survey updates)

Column 5--Building Code Provisions Requiring Energy Efficiency

Energy Pollution Matrix Notes

Energy Consumption/Trillion Btu: State Energy Data Report: Consumption Estimates 1960-1985, U.S. Department of Energy, Energy Information Administration, 1987.

Oil Production/Thousands of Barrels: Petroleum Supply Annual 1986, U. S. Department of Energy, Energy Information Administration, p. 31.

Gas Production/Million Cubic Feet Marketed: Natural Gas Monthly, U.S. Department of Energy, Energy Information Administration, July 1987, p.44.

Number of Gas and Oil Surface Impoundments: Subtitle D Report (Draft), U. S. Environmental Protection Agency, Office of Solid Waste, 1986.

Acres Surface Mined/Acres Reclaimed: These acreage figures represent the period of 1978-1986. Source: Surface Mining 1978-1986, U.S. Department of Interior, Office of Surface Mining, 1987.

Acid Rain Policies: 1987 State of the States report, and telephone updates, Fund for Renewable Energy and the Environment, January 1988.

Number of Nuclear Plants in Commercial Operation/Number Under Construction: Nuclear Information and Resource Service, Washington, D.C.

On-Site High Level Radioative Waste Storage Pool to Meet Authorized Capacity: Licensed Operating Reactors, volume 10, number 20, U.S. Nuclear Regulatory Commission, November 1986.

High Level and Low Level Radioactive Waste Facilities: The 1985 State-By-State Assessment of Low Level Radioactive Waste Shipped to Commercial Disposal Sites, U. S. Department of Energy , December 1986; also updates from Nuclear Information and Resources Service, Washington, D.C., January 1988.

Least-Cost Policies: Least Cost Electrical Planning: Is There Really A State Movement?, Critical Mass Enegy Project, December 1985; also see A Brighter Future, State Actions In Least Cost Electrical Planning, Energy Conservation Coalition, Washington, D.C., December 1987.

Renewable Energy Tax Credits: Source: 1987 State of the States report and telephone updates, Fund for Renewable Energy and the Environment, January 1988.

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